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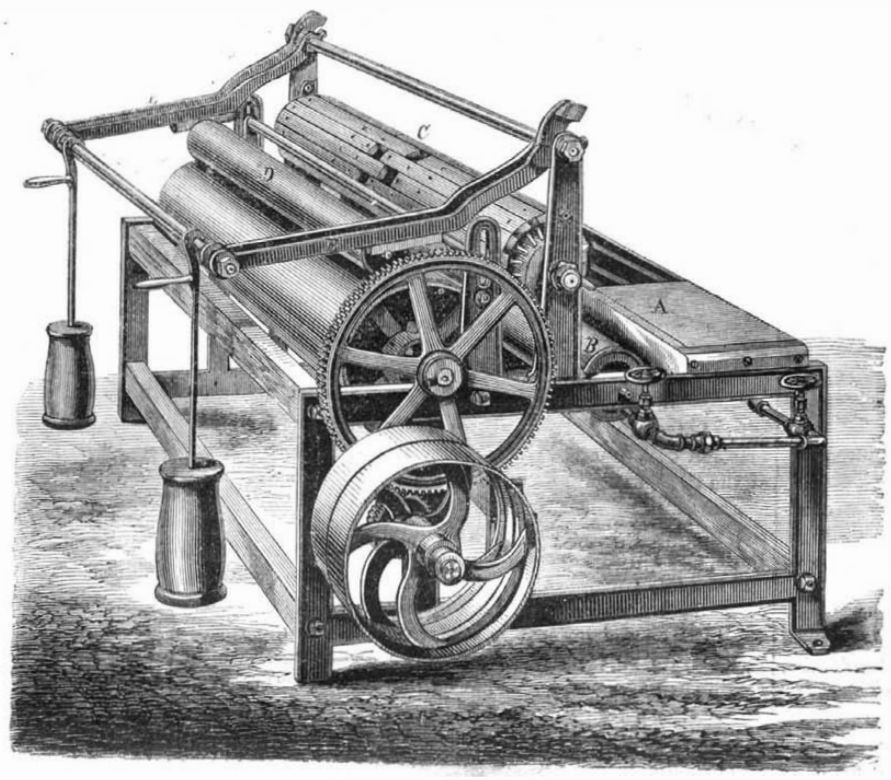
### Improved Machine for Stretching and Winding Woolen Cloth.

All woolen manufacturers are more or less troubled by their goods becoming "cocked" or "mill wrinkled" in the process of manufacture, and the object of the inventor of this machine has been to cure this difficulty. This machine removes all these imperfections, and brings out the cloth perfectly smooth and even, obviating at the same time any annoyance from tight and slack "listing," which is sometimes found to be a detriment to woolen goods in finishing.

The mode in which the machine is used will easily be understood by those skilled in the business, and a brief explanation will suffice. All fulled goods after being washed, and the water thrown out by the hydro-extractor, should be run through this machine, and the steam applied—more or less as is required—heavy cloths requiring more steam than light ones. The cloth should then remain on the rolls over night, and by this method all sponginess will be prevented, a much better felt will be secured, causing it to be firm without diminishing its length or width, and enabling the finisher to produce a very fine, even face.



FRINK'S PATENT CLOTH WINDER.

A is a trough in which is a coil of steam pipes which are perforated to moisten the cloth as it passes over said trough. B is a stationary hollow copper cylinder, heated by steam introduced by a pipe. C is an extension roll which draws the cloth lengthwise and removes mill wrinkles and cockles from the same, and can be so adjusted as to stretch the cloth as much or as little as required. D represents the roll on which the cloth is wound, as it passes from the extension roll. E represents the arms which hold the roll on the drum, and are adjustable to broad or narrow goods, being weighted as shown in the engraving.

It has been usual heretofore to subject the cloth to the action of the gig after the fulling; and in order to stretch the cloth widthwise and remove the mill wrinkles and cockles, it has been usual to apply temples upon the wrong side of the cloth as it goes through the gig. An attendant is required to raise these temples as they pass the teasels, or else the cloth will be wefted when pressed upon by the temples. Neglect of the attendant often causes cloth to be injured in this manner.

This machine has been adopted by some of the leading manufacturers in the country. It was patented Dec. 3, 1867, and is for sale by Harwood & Quincy, 25 Bromfield street, Boston, Mass., to whom all orders should be addressed.

### Improved Hat Band Buckle for Holding Railroad Tickets.

While it is a trouble to the railway passenger to be compelled to fumble in his pockets after passing every station, to find his ticket for the convenience of the conductor, it is also a trouble to the latter. But many travelers refuse to observe the direction printed on the ticket, "Keep this in sight," because of the defacement of the hat and the danger of losing the ticket by placing and replacing it in the hat band, which may be loose.

BURTON'S PATENT SPRING BUCKLE.

In the engraving is seen a style of spring buckle which will firmly hold any slip of paper placed between its jaws. The buckle is as elegant in appearance as the ordinary buckle and may be made of any form, as seen. On the square buckle the side uprights are double, the lower ends of the outside pieces being secured to the main portion and the upper ends being curved slightly outward, for convenience of placing the ticket in place. On the oval buckle there is but one holder, it being parallel with the upright bar in the center. These holder strips are springs, so that they effectually hold the ticket in place.

Patented through the Scientific American Patent Agency March 10th, 1868, by J. N. Burton, who may be addressed for rights for manufacturing or for territory, at Senoia, Coweta Co., Ga., or his agents, J. M. Keep & Co., No. 8 Dey street, New York city, will answer all communications.

### To Toughen and Refine Gold.

This invention has for its object the toughening of brittle gold bullion, and the refining of alloyed gold whilst in a melted state, together with the separation therefrom of the silver they may contain. This is effected by means of chlorine gas, brought in contact with the alloyed gold when the metal is in a molten state. In this manner the silver present, and any baser metals which render the gold brittle, are converted into chlorides, whilst the gold remains in a purified and tough condition.

The crucible is heated in a furnace, and the gold is melted in the usual way, with a small quantity of borax. The crucible has a closely-fitting cover, with a small hole bored through it; and when the metal is melted, a fire-clay tube of, say, three sixteenths of an inch internal diameter, is inserted through this hole, so as to dip into the molten gold down to the bottom of the pot. The upper end of the tube is connected, by a vulcanized india-rubber pipe, with a glass or stone-ware vessel, in which chlorine is generated. The joints are tied round with wire, and the india rubber is protected from the direct radiation from the fire. The chlorine generator is fitted with a safety tube, say six feet long, dipping, at its lower end, into the liquid in the generator, and the liquid stands in this tube to such a hight as is equivalent to the pressure necessary to force the gas through the melted gold which is above the end of the fire-clay tube. The current of gas through the metal is maintained for about three hours, and the metal may advantageously be agitated, from time to time, by stopping the flow of the gas for a moment by pinching the india-rubber pipe until the pressure ceases, and then allowing the accumulated gas to pass suddenly. At the end of this operation the gold will be nearly pure, and the chloride of silver formed will be floating on its surface, together with such other chlorides as may be formed, and which are not readily volatilized. The contents of the crucible may be poured out all together into moulds, so as to form ingots; and the chlorides are, in this case, detached from the surfaces of the ingots when they are cold; or, by preference, the metal is allowed to cool in the crucible until it sets, and the still liquid chlorides are then poured from its surface into a mould, so as to form a slab.

The borax is, in this operation, retained in the crucible, and in this no difficulty will be found, as it is much less fluid than the chlorides. The crucible, still containing the gold, is at once replaced in the furnace until the purified gold is again melted, and it is then cast into ingots.

The chloride of silver, and the other chlorides mixed there with, are reduced to the metallic state by one or other of the processes commonly employed for this purpose. Patented by Francis Bowyer Miller, Sydney, New South Wales.

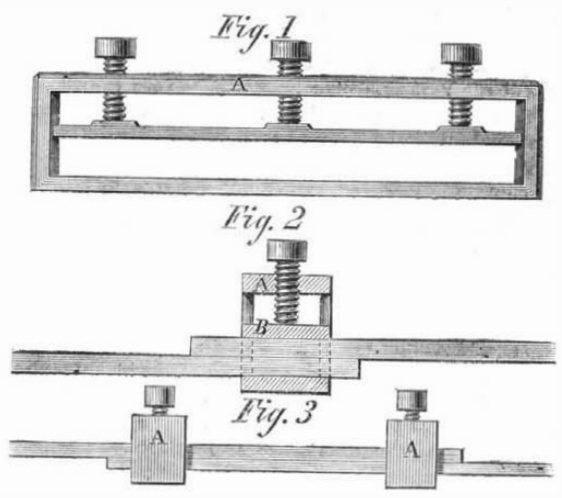
### Composition Oil.

The nature of this invention relates to utilizing the waste from paper mills, said waste being the liquid which runs from the certain oils, produces a composition or an oil to be used as a substitute for linseed oil in the various preparations of paints, putty, and cement, or for all the purposes for which pure linseed oil is ordinarily used, for painting, etc. The following is a full and complete description of the ingredients, and manner of compounding the same:

This liquor or waste is subjected to a process of cleansing, by filtration or otherwise, if intended for fine work. With this liquor is compounded, in about equal parts, according to the strength of the liquid, linseed oil, or other oils of an analogous nature, or with the distillates of petroleum. This fluid or waste, when mixed with linseed oil in about the proportion above said, forms a thick semi-transparent fluid or oil, which may be thinned down to a proper consistency for painting, by the use of turpentine or benzine, in the ordinary way, and which, of itself, forms an excellent varnish, which dries, having a hard, glassy surface, and fireproof. This composition readily combines with the various pigments, as white lead, zinc, ochres, and other coloring materials ordinarily used for painting, making a hard, durable, glassy, and fire-proof paint, which can be laid on with a brush with the same facility as the best linseed oil paint, and at little more than one half the expense. This oil, when combined with whiting and lead, makes a good putty for glazing, much stronger and more tenacious than ordinary putty, and will not crack and peel off by exposure to the weather; and when used simply in combination with lime, it forms a strong, hard cement, or stone-like substance, which, for roofing purposes, when made of a proper consistency, can be spread on with a trowel, on tin, sheet iron, or paper. This coating soon becomes as hard and strong as slate. Recently patented by William Ward of Cleveland Ohio.

### THOMAS' PATENT BELT COUPLING.

The design of the device illustrated in the engravings is to obviate the necessity of lacing belts, and to provide a ready means of taking them up when slack, and loosening them when too tight. Its simplicity is apparent at a glance. Fig. 1 is a front or face view of the improvement; Fig. 2 a vertical transverse section, and Fig. 3 an end view. It is simply a flat, rectangular collar, A, in one piece, having, sliding within it, a clamping plate, B, the ends of which are slotted to fit projections on the inside of the band. This clamp bar is forced down on the belt by three or more set screws, according to the width of the belt, the sizes of the clamps or coupling being adapted to the different widths of belts. Its method of application is shown plainly in Figs. 2 and 3.




It is well known that leather belts contract and expand with changes of temperature, at times being too slack to drive well, and again so tight as to be strained. Also, if a belt of the proper length breaks by the tearing out of the lacing holes, a piece must be put in to make up the required length, which is a process requiring considerable time. The intention of the inventor of this device is to provide against both these contingencies. To accomplish this he overlaps the ends of the belts, as in Fig. 3, and places a clamp on each end. The belt can thus be taken up or let out very quickly and effectively.

Patented through the Scientific American Patent Agency, Feb. 11. 1868, by John L. Thomas, who may be addressed relative to the sale of the entire right, or of territorial rights, at Alliance, Ohio.

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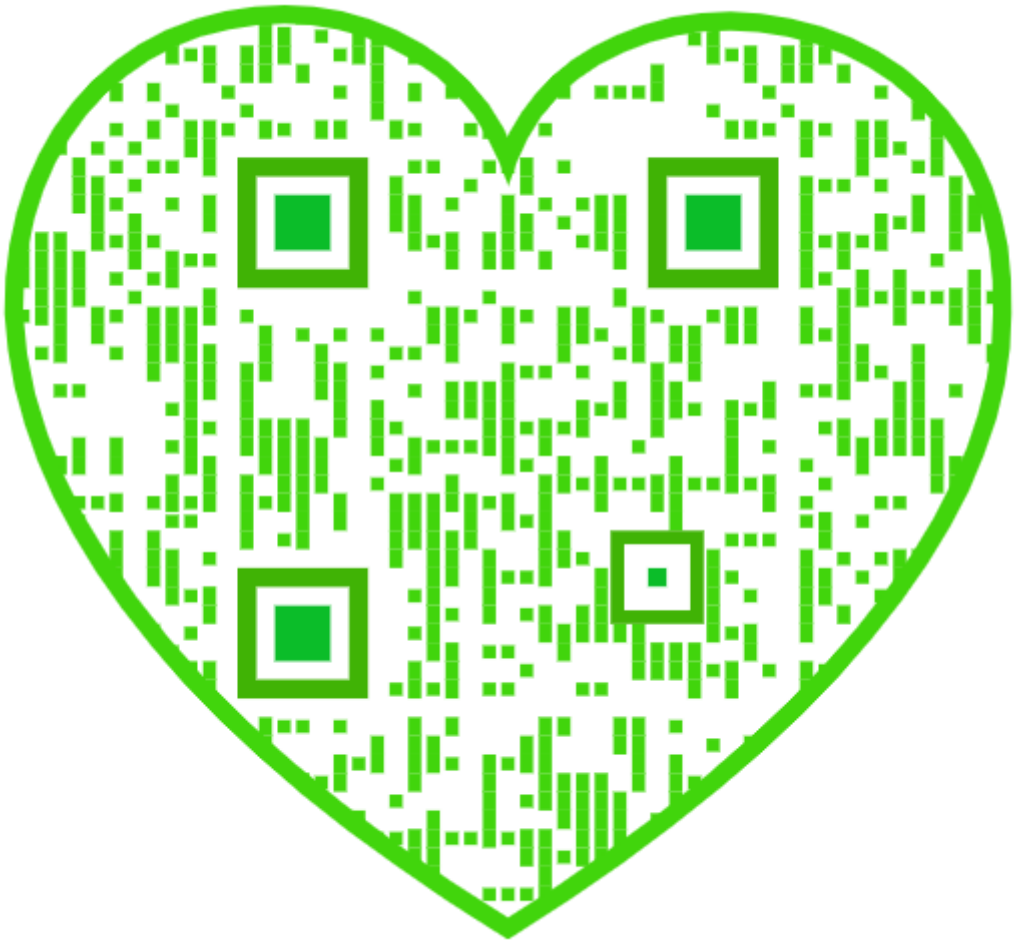

## EDITORIAL CORRESPONDENCE.

*Dangerous Places in Rome—St. Peter's—The Vatican—Sculpture—Statue of Augustus Cesar and other Ancient Worthies—Pictures—Raphael and Domenichino—Fashionable Driving on Monte Pincio—Heretical Churches—Carnivals in Italy.*

NORTHERN ITALY, March 2, 1868.

Previous to the recent unhappy outbreak in Italy the revolutionists in Rome had succeeded in some stealthy way in mining several buildings in the city, but fortunately no mines were fired, except under some barracks near to the Vatican, which were reduced to ruins, several soldiers being killed or maimed by the explosion. A theater, standing near the bridge of St. Angelo, was pointed out to me as one of the spots under which the infernal train had been laid; and it was feared that even St. Peter's might be blown to flinders, therefore an order was issued shutting up the crypt, also the gallery leading to the dome. I said to the guard that it would scarcely be possible for evil disposed persons to inflict serious damage upon the church, even if they were allowed to ascend the dome; but, he said, some one might throw out a false flag, which would be looked upon as a bad omen.

It does not seem to me possible that any one could be found sufficiently depraved to attempt to injure a building so noble as is St. Peter's. Apart from its religious character, and considered merely as an architectural monument, it has been criticised and praised as one of the most wonderful structures ever erected—not on account of its exterior, which, owing to its unfavorable situation and surroundings, is not imposing, but chiefly for its immense size—for its famous colonade, fine front, vast interior, and truly majestic dome, which rises 405 feet above the pavements, or, to the top of the cross, 448 feet. It will be remembered that Michael Angelo was eighty-seven years old when he finished the dome. He declared that he would lift the Pantheon in the air; and, for seventeen years, he gratuitously directed an undertaking which had enriched some of the earlier architects.

It is difficult to believe that the dome of St. Peter's is as large as the Pantheon, but such is the fact—the difference being very slight. One peculiarity about St. Peter's is noticed by every visitor, viz., the equable temperature, which is said to be nearly the same the whole year. Churches in Europe, during winter, are usually cold, comfortless places, and are not improperly regarded as the sepulchres of unacclimated strangers. I believe that many visitors expose themselves to premature death by the chill and damp of these churches.

The first impression of the size of the interior of St. Peter's is always disappointing; but this feeling wears away after a few visits, when the visitor has had time to study its details, and wander about its naves and chapels. The Spanish cathedrals are pervaded by a rich, solemn gloom; they impress the mind as religious sanctuaries, where devout people come to worship God; but the leading churches of Rome, it seems to me, awaken no such impression. The interior of St. Peter's is warm, light, and cheerful; its fine mosaic pictures, its splendid monuments, and its numerous array of marble statues, some of which Dickens has described as "breezy maniacs," together with the multitude of strangers with the inevitable Murray in hand, and the paucity of worshipers, make the place seem more like a vast museum than a church.

It is remarkable that the attendance upon the ordinary religious services of St. Peter's is very slim, owing to the fact that the Catholic people of Rome do not relish the prying and intrusive curiosisy of so many strangers. It is frequently noticed that persons who kneel to pray have their attention drawn off by stylish ladies who sweep along dressed in the latest Paris fashions. I think I am correct in saying that St. Peter's is no place for devout prayer, especially in the hight of the season.

The palace of the Vatican, or more properly speaking, the palaces of the Vatican, adjoin St. Peter's. They constitute a vast pile of irregular building, from whatever point the view is obtained. There is no harmony, no unity, all seems to be confusion. Everybody is curious to know in what part of the edifice the Pope resides, and where Antonelli takes up his headquarters; but no one seems to know, except that certain long, tedious stairways are supposed finally to reach the apartments occupied by these celebrated personages.

The Vatican is a very bewildering structure; its length is about 1,200 feet, and its breadth is 767 feet. It has 8 grand staircases, 200 smaller ones, 20 courts, and 4,422 rooms.

No other palace in the world approaches it in historic interest, whether as regards its influence upon the Christian world, or the marvellous collections of books, manuscripts, statuary, paintings, and other objects of ancient art and learning.

Take, for example, the apartments devoted to the rich library, enter the grand saloon, not a book, not a manuscript, not a scrap of paper to be seen. The ceilings, side walls, and presses, are all most profusely embellished. Pass into the long gallery, 1,200 feet long, and here also is the same liberal adornment. Nothing else visible, excepting some very rare and costly objects of art—the books being all carefully concealed from public view. I doubt if any other palace in the world possesses rooms of equal size and splendor. The Pope lives and rides in imperial style. I can describe nothing in very minute detail, but the statuary and sculpture of the Vatican alone is the finest collection in the world.

Nothing that I have seen in Rome has so much impressed me as to stand in front of the statues of the Cesars, Scipios, Trajan, Titus, Nero, Cicero, Marc Antony, Lucius Verus, Marcellus, Marcus Aurelius, Septimus Severus, Demosthenes, and other great names, and to feel that these statues were modeled after their living forms.

The particular statue that interested me most was that of Augustus Cesar, found in 1863 among the ruins of the villa of the Empress Livia, on the Via Flammina, about eight miles from Rome. So very perfect was this statue that few restorations were needed. It is of fine Greek marble, nine feet high, and is considered the finest likeness in existence of the great Roman emperor, of whom Christ said: "Render unto Cesar the things that are Cesar's;" and, when Paul was accused before Agrippi, the king answered: "If this man had not appealed unto Cesar he might have been set at liberty." The figure is very noble. It represents Augustus in the vigor of his manhood, carrying upon his left arm the Roman scepter, his right arm gracefully extended, as if in the act of delivering an address. Here is also a full length portrait of Demosthenes, one of the noblest works of antiquity, of which Rome possesses an exhaustless store of riches.

I was quite disappointed in the picture gallery of the Vatican, as, from remarks made by enthusiastic travelers, my mind was made up for something wonderful in art. The famous collection has three inferior Murillos, presented to the Pope by the Queen of Spain,—the Spaniards hold fast to Murillo's best works. Here is also the Transfiguration of our Lord—the last great work of Raphael—the power and beauty of the picture being somewhat marred by another artist, who painted the arms of the "demoniac boy" of unnatural size. There are other good Raphaels also. The Communion of St. Jerome, by Domenichino, which ranks as the second great picture of the world; and, undoubtedly, it is a powerful example of nature in art. But it is hardly to be supposed that this beloved saint, in his emaciated, dying state, could have been left to suffer and die in a condition nearly nude, and surrounded as he was by his brethren, clothed in fine raiment. Certainly, winter, in the chilly chambers of the Vatican, is not a good time to look at the dying St. Jerome. The whole collection of the Vatican amounts to about fifty pictures, some of which appeared to me indifferent works. I do not profess, however, to be an art-critic; but I claim the privilege of judging for myself what suits me in art, in spite of the criticisms of proficient writers on such subjects.

The palaces of Rome are very numerous—there are about seventy-five—some of which are historically famous. Such is the Lateran, once the papal residence, now given up to a museum of antiquities; the Quirinale, the summer residence of the Pope, famous also as the place where the cardinals assemble during the conclave, to vote for and elect the pontiff; the private palaces of the Borghese—Barberini, Corsini, Doria, and Farnese—all contain good collections of paintings and statuary; while in the Spada Palace is to be seen the colossal statue of Pompey, "at the base of which great Cesar fell." Upon the immediate environs of Rome are several fine private villas; also, a spot known as Monte Pincio—a small, circular space, somewhat larger than the tent of an ordinary circus, but affording a fine view and a charming promenade and drive—a fashionable drive occupied chiefly by English and Americans, who ride round in hired carriages to look at each other. After three or four turns around the Pincio—which can be made in fifteen or twenty minutes—the whole thing begins to appear ridiculous, and one after another of the carriages draw off to a side stand, or depart for the grounds of the Villa Borghese, or on some of the other pleasant excursions about Rome. To have a genteel standing, however, in Rome, one must drive every pleasant day around the Pincio, in a carriage that can boast no number painted upon it.

Cardinals, robed in their long, scarlet cloaks, and broad-brimmed hats, are usually to be seen upon all the principal promenades and byways about Rome. Their carriages are very heavy, and are drawn by a pair of black horses, with driver, and two very clumsy-looking footmen standing up behind. When the cardinal gets out to walk, these footmen follow at a respectful distance. The universal custom is to bow to the cardinals, a civility which is always very graciously returned.

With the exception of the Jewish synagogues, the pontifical government tolerates no church other than Catholic within the walls of Rome. The chapels of the heterodox legations—those, for instance, of Russia and Prussia—must be concealed from public view. The Episcopalians and Presbyterians have their places of worship, but they are situated outside on the Via Flammina, in a building which has no ecclesiastical appearance. Indeed, if I mistake not, there is a wine and beer shop on the corner, next to the English chapel entrance. Religious intolerance, however, is rapidly giving way throughout all Europe—Rome being now the only exception, in a somewhat modified form; for certainly the authorities have it in their power to drive away all public establishments of an heretical character.

The government was very anxious that the Romans should be highly amused this year, therefore it put forth extra exertions to render the carnival a day of festive fun and amusement. It opened very well, as I can testify; but apart from the, to me, novel horse-racing down the Corso, the sport seemed to be carried on by strangers, who displayed a great deal of vigor in throwing *confetti*, sugar plums, and bouquets, to fair Roman girls, who appeared in the balconies to invite such attention. There were comparatively few fanciful costumes, either guilty of having taken part in the recent revolution, or suspected of active sympathy therewith. At Leghorn we saw something more of the carnival; at Bologna the great procession occurred the day we left; at Venice we enjoyed an old-fashioned Venetian carnival for six days; at Milan we had another experience of three days; and we arrived in Turin the last day, and just in time to see the procession before it broke up; so that we are tolerably well instructed in the nature and character of Italian carnivals.

S. H. W.

### Animal Electricity.

Recent experiments have confirmed the theory that animal electricity does not owe its origin to the formerly imagined action of the nerves or muscles, but emanates directly from a purely chemical source, the exciting cause being generated by the contact of the air with the incipient decomposition of the freshly killed animal. Bearing in mind that a liquid but very slightly saline, in contact with animal substance, is an electrometer, it is easy to perceive that the so called muscular current is nothing more than the current produced by their contact. To put beyond a doubt the question that a live muscle would generate electricity, which it could not produce when dead, contact has been made between the muscles of a live animal and the wires of a galvanometer, without the latter evincing the slightest sign of an electrical current. Moreover, if a portion of muscle be separated from the body of an animal freshly killed, and placed in communication with a galvanometer, a feeble degree of electricity is demonstrated. According to the opinion of a member of l'Academie Française, this is due to the influence of oxygen upon the flesh, a cause always existing when the muscles retain their normal state of irritability. Assuming that animal electricity was due to the cause surmised by Galvini, the evidence of the current would cease so soon as the muscles become completely inert, or, so to speak, completely dead. But the reverse is the fact. The more decomposed the flesh becomes the stronger are the advances of its electrical condition, and when it has acquired a state of almost total putridity, it imparts the maximum deviation to the astatic needle. That the presence of a saline liquid is necessary to these electrical effects, is proved convincingly by several circumstances. One is that meat newly salted becomes electrical in proportion to the penetration of the solution, and the other that cured meats, whether beef, pork, or fish, evince a high state of electrical development. The blood of a living animal is altogether destitute of electrical excitation, but becomes capable of affecting the galvanometer so soon as the animal is killed, and its power increases with the putrefaction of the body. A small addition of common salt to the blood immediately increases its electrical sensibility. If the epidermis of an animal be removed, the underlayers of cuticle are highly electrical, as the experiments upon frogs have demonstrated, and this condition is still further augmented by the addition of a saline solution.

From these results we are justified in assuming that animal electricity in its original symptoms is a delusion, and that without the intervention of some slight saline liquid the nerves and muscles are *per se*, powerless to afford the smallest evidence of an electrical current. Unless a chemical action can be set up there is nothing to indicate the presence of that vital muscular agency which the first experiments in connection with the subject led the older philosophers to insist upon and adhere to. The animal current, which they so fondly propounded and believed in, is simply an ordinary electrical current produced chemically by the contact of a saline solution with animal matter, in which combination the salt acts the part of the electrometer. Adopting this view of the question, it is easy to perceive that the development of animal electricity, in invalids and diseased organs, instead of being due to the cause originally entertained, is solely the consequence of chemical decomposition. Thus, for instance, the mucous membrane of the mouth becomes electrical in patients suffering under disease of the stomach or digestive organs, and strong evidences of it are manifested in malignant, cancerous, and other ulcers of a dangerous and fatal type. All animal excretions are electrical, and urine possesses this property in so remarkable a degree as to cause the needle of a galanometer to make a complete revolution of the dial. The electricity of fishes results from an alkaline solution in the cells of the electric organs, and manifests itself very powerfully. All the effects of animal electricity may therefore be regarded as closely resembling those of fermentation and putrefaction, and to depend not upon any muscular or nervous hypothesis, but solely upon an incipient chemical decomposition in combination with chemical electrometers.—*The Engineer.*

### Packfong and White Metal.

The *Journal of Applied Chemistry* says:—Packfong or Pakfong or Tutenag, is an alloy, known by these names among the Chinese, and is composed of nickel and zinc, of each seven parts, and copper five parts. Another quality, known by the same name,

parts; copper twenty-one parts and zinc twenty-eight parts. Both these alloys are sometimes called Chinese white copper, and are nearly the same as German silver. We give several formulæ for the latter:—Nickel and zinc, of each one part; of copper two parts. This composes the finest quality. For rolling, nickel, twenty-five parts; zinc, twenty parts; copper, sixty parts. For castings, nickel and zinc, of each twenty parts; copper sixty parts; lead three parts. The original German silver is made from copper, forty parts; nickel thirty-two parts; zinc twenty-five parts; iron three parts. All the above are used as substitutes for silver, to which they are in many cases preferable for durability.

### New Mode of Preserving Eggs.

Joseph Blakeley, of Bordentown, N. J., has patented the following:

"I take an egg in its natural condition and divest the integument thereof of its mineral portions [he means in plain English that he dissolves the shell] by immersing it for a sufficient time in dilute acid, as acetic acid for instance, after which I wash the egg in cold water, for the purpose of cleansing it from any acid that may adhere. I then dry it *in vacuo* at a low temperature. When the egg is to be used it may be laid in cold water for a few moments, when the integument can be readily removed, and the egg can then be used."

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## STEAM BOILERS—THEIR CONSTRUCTION AND USE.

We make the following extracts from an address delivered recently before the Institute of Technology, in Boston, by Mr. J. A. Miller, a practical engineer and boiler maker of New York city. Many of his ideas if not new are quite suggestive:

One hundred years ago last November, Watt completed the first practically perfect steam engine. It may be fairly asserted that for the first fifty years its introduction was only in an experimental manner; when we consider that in 1812 the first steam engine in the New England States was erected in the city of Providence, for the Providence Dyeing Bleaching and Calendering Company, on the very spot on which the boiler now stands. What wonderous revolutions have not been effected by this mighty engine in a half a century. Fifty years ago a commission of the greatest scientific men of the day reported to Napoleon I. that the application of steam to the propulsion of vessels was a visionary and an impractical idea. Yet, in the short span of time, the steam engine has become so important to mankind, that if by some sudden chance men should be deprived of its use, the greater portion of the people on the civilized globe would be plunged into want and misery, and a large portion would surely die of starvation.

Yet this mighty steam engine is only as the lever, or any other mechanical device. It is not the source of any power, contains no power within itself; but is simply an instrument to apply the power generated in the boiler. The engine being the more showy and attractive part, has received all the care and attention that could be lavished upon it, whereas the steam boiler is left to the narrow notions which daily routine so frequently engenders. Mechanically constructed by a boiler maker, it is considered safe, perfect, and will pass inspection if it be only tight and able to stand a given pressure. That the steam boiler is far behind the engine, can be easily understood; when we consider that the best engines made will realize from eighty to eighty-six per cent of available power out of the power applied from the boiler. How is it with the boiler? The percentage of available power produced by the combustion of fuel averages for wood five, for bituminous coal seven, and for anthracite coal eight and a half per cent. When we consider that we get, at best, less than one tenth the power out of our fuel, in the best boiler in use, we can easily appreciate how much can and must be done to bring the boiler on a level with the engine. That the steam boiler can be made to give within a small fraction the whole theoretic power as well as the steam engine, and that it can be made as safe as a water wheel, can only be doubted by those that have never held sweet communion with nature, and admired the beauty and perfection of her laws. That steam boilers at present are not safe, is a lamentable fact, that they can be made safe, I have repeatedly proven. All that is required, is to make the construction of steam boilers a separate branch—not in a mechanic sense; but let scientific men study the laws applicable to steam, in all its relations, and soon the day will come when well defined laws govern its construction. At present, there has been no attempt at system, and many of the causes of its rapid destruction, although well known, are constantly ignored. Incrustation; that greatest source of boiler destruction, it not for one moment considered, but left to injurious powders as a remedy, when the disease is much easier reached. Nothing is done to insure circulation of the water, so as to carry the steam, as soon as made, into the steam space. Priming is only considered when the boiler proves useless on this account. There is nothing done to protect it against sudden strains which so disastrously weaken boilers. No, the boiler is simply made tight, as to the rest, it is left to chance or good luck; and yet, if it explodes and kills, maims, and carries destruction to all surroundings, the burden is laid on some mysterious cause, beyond the control of engineer or owner.

When, in a boiler, we find some attention paid to conveying the heat generated in the furnace into the boiler, we will be sure to find the question of evaporation completely set aside. When a boiler foams, or makes wet steam, a steam dome is carried up around the chimney, or the heat is carried over the top of the boiler, or a super-heater is used. All of these have been found useful and beneficial, yet they are at best but remedies—after thoughts—and, when not wrong in themselves, show conclusively that there is something seriously wrong in the boiler. Such remedies are on a par with the cobbler who, in trimming, cut the uppers of a pair of shoes and then charged at once for mending the new shoes. The plainest evidence that steam boilers are built without regard or knowledge of the natural laws applicable to the production of steam, lies in the lamentable fact that more than four hundred and twenty different forms of boilers are made, each claiming some superiority over the others; and, strange to say, not without some show of reason. Another fact, and one, I hold, fully demonstrating the lamentable state of ignorance in all that relates to vaporization, is that a boiler, and one of the latest improvements, claims to be so strong that it cannot burst under any practical steam pressure! Now what would we think of the intelligence of an individual, who having lost some gunpowder by explosion, would have his powder kegs bound with strong iron hoops, or would the Pacific Mail Steamship Company carry nitro glycerin if put up in spheres tested at 600 lbs. to the square inch. The cause, it must be evident, still remains; and the effect would be worse. If we wish to make powder non-explosive, we mix some foreign matter with it, and thereby prevent the conditions under which explosions take place; we do not strengthen the receptacle. If we would have boilers safe we must do the same, and not resort to the doubtful expedient of simple strength.

A steam boiler tested and built to work under a pressure of 80 lbs., is worse than a powder mill, if under any circumstances that pressure may be increased accidentally, even one pound. An English writer on this subject says: "It is a truism that the strength of any structure is its weakest point," but who can say where the weakest point of a steam boiler is; as ordinarily made. Some will say the safety valve is an efficient remedy, while others contend that the same has been found wanting in many cases; both parties are right. A steam generator in the true sense of the word, one that will make dry steam without superheating in any manner, one that will simply change the cohesive force of the water the repellant force of the steam, and leave the water a dense mass free from steam, such a steam generator wants only a simple and reliable safety valve. But a regular steam boiler (we had better call it a water boiler), wants more, or rather to make it perfectly safe under all circumstances, wants—well, it wants to be kept cool.

I have for years made heat and steam my specialty. I have experimented during that time on a pretty large scale, and on all kinds of boilers. I have examined forty-eight exploded boilers carefully, have conversed and compared notes with practical men at home and abroad on this subject. I believe that I understand this subject as thoroughly as Professor Agassiz does anatomy, and I am learning, laboring, reading, and investigating daily, yet I own, that the more I search the more clearly I comprehend the laws that lie at the root of the production of steam, the more I marvel not that steam boilers explode, no, but rather that they do not explode more often. When on a steamer I hold my life worth but little, when I think that there is a power, and a more dangerous power, stored in the boilers, than could be in a hundred powder kegs; when I think that this power is under the control of men knowing nothing of its laws, and little more of its nature, than the children in New York did, who threw a piece of conglomerated powder (dropped by a careless cartman in the street) into the fire, causing the loss of four innocent lives. Tell this man of his great responsibility, of the number of lives placed in his hands and dependent on his skill, and he will point to the glass gage, if such a thing is used at all, considering that all is done that can be done when the water is at a sufficient hight. And yet there are many cases on record, where it is known beyond a doubt, that at the time of explosion the water was at its proper hight. So great, in fact, is the fear of low water, that I do not think one engineer in a thousand ever lets his water get low enough to cause danger from that source. There are many boilers so constructed that the water actually changes place with the steam, or where the water is lifted out of the lower, or water leg, and is forced into the steam room. To such an extent does this take place at times, that water is found in the upper gages.

Are such steam boilers safe? Are they constructed for any definite object except to boil water?

Let an inspector examine such a boiler, and he will subject it to a certain cold-water pressure, and certify to its capacity. Now I will here make the assertion, that there are plates in most boilers which are subject to a higher strain empty, without any steam pressure in the boiler, than they are under a hundred-pound pressure. The construction of our boilers at present depends on so many faithful or faithless, sober or drunken, skillful or ignorant men, on whom the contractor does, or must depend, that no man can be for one moment responsible for their safety.

If a steam boiler were made of a flexible material, in the same manner as they are made of boiler iron, it would present a curious shape and puckered seams, but the iron allows the boiler maker to hammer it into shape. Each sheet is stretched and pulled and hammered, sometimes more than the iron can stand, and the sheet is taken out, torn and rent, before the boiler is completed.

All this is wrong, and the sooner we leave off forcing and compelling unfit material to assume an unnatural shape, and perform unnatural functions the better.

All things in nature or art to be perfect, must be graceful and harmonious. The strongest beam we can cut out of a tree will be the most agreeable to the eye. A steam engine that works silently, smoothly, you need not ask, but be sure it works well. The same is true of gearings, railroads, and all other machines, tools, or other things that move; a graceful motion is a sure indication of speed in a horse, or any other animal, the one that moves most gracefully, moves with the least expenditure of force. It is a fundamental law, that perfection, harmonious operations and economy, go hand in hand.

Here, one word about the safety valve. It is too frequently the case that a number of boilers are connected by one steam pipe, and that for convenience sake, the safety valve is placed so remote from the boiler that it can, under no conditions, be more than a simple pressure gage, wholly inadequate to carry off any steam, that may from some cause, be rapidly forming in the boiler above the working pressure. Directly on the boiler, and that on each boiler, is the proper place for a safety valve.

If we lift the safety valve on a cylindrical boiler made of a glass tube, we will at once see the water suddenly rise like a wave—we see in both ends the water fall and all flowing toward the center. If not sufficient steam pressure is stored up in the water, we see it suddenly return to its level, and observe a violent agitation of the water. If an engine is attached to the boiler, we see the same agitation at every stroke.

Is there no lesson in all this? If not, do not all explosions happen, either at the moment the safety valve is rising, or when the engine is either started or taken fresh steam, or when dye beeks or tanks are suddenly connected? We have hundreds of well authenticated cases to prove this. As there is no circulation in the water, and as most water contains some impurities, the water can be heeted to a higher degree of temperature than corresponds with the pressure of the steam, if we now, by opening a valve, cause a local relief of pressure, the water nearest the valve first rises, then suddenly falls, causes agitation of the same, and a sudden relief of large quantities of steam, which, if the boiler is weak at any one spot, causes rupture, and this rupture causing additional relief and additional generation of steam, causes the explosion.

### Imitating Cluster Jewelry.

"'Cluster work,' or that style of jewelry which, in the form of breast pins, buttons, earrings, etc., consists of an aggregation of small stones arranged in a cluster, is commonly made by mounting each stone, or its glass imitation, in an appropriate plate, furnished with as many settings as there are stones, each stone being held in the grasp of its appropriate setting by the friction of the edge of the latter against the surface of the stone. In the manufacture of genuine work this method is the only one practicable, on account of the small size and high value of the jewels employed."

The present improvement applies only to the manufacture of imitation cluster jewelry, and consists in having the "jewels" all made in one piece or plate of glass, the "jewels" being raised on the glass plate, forming bosses. The setting is also made in one piece of metal—a sort of net work, filling the spaces between the bosses.

Recently patented by W. O. Draper, A. C. Sweetland and G. H. Draper, of North Attleboro, Mass.

### Mechanical Decoy Bird.

"My invention is designed to supply cheaply, to gunners, a means for causing, at will, a motion of the wings of a decoy, to attract the attention of flying birds; and it consists in the combination, with the body of a decoy, of wings which are made to move by a line or lines leading from the body of the decoy to the gunner, so that he can, at will, by pulling on the string or strings, cause a movement of the wings, which will attract the attention of flying birds." Patented by Nathaniel Wales, Boston, Mass.

## Science Familiarly Illustrated.

### Curious Things About Frost.

One morning in October I found all the tomato and pumpkin vines used up and killed by frost, but the bean vines, the potatoes and the cabbages in my garden were in fine order still. Three weeks after the frost came again, and not finding any tomatoes and pumpkins, he laid hold on my pole beans and my potatoes. They became black and died as if strangled. An old farmer said that this frost that killed the potatoes was a "real black frost."

"Ha!" said I, "black frost and white frost—do they ever mix?"

"You watch and you'll see the difference," said the old farmer.

And I began to watch. The cabbage in my garden was not killed yet. The chickens have a wonderfully good time nipping off the edges of the big, tough leaves. Well, I watched to see what the frost would do next. One morning I noticed that the bridges and the board walks were white as snow, but the dirt roads, gravel walks and stone sidewalks could not show a single speck of frost. And I saw that there was no frost on or near the spikes in the board walk, but were spots instead.

Yet I remember, on one winter day about noon, when things were thawing a little, that the board walks all dried off, leaving a spot of frost on each spike, and all the stone walks and dirt roads were cold and hard as ever with snow and ice! Every fall the boards become frosty, while the spikes and stones are warm and wet. Every spring the boards are warm and wet, while the spikes and stones are frosty! Funny frost!

One day the good woman who cooks for us, made some doughnuts, some folks call them fried cakes (they are good no matter what you call them), and when she had done frying them, she set the hot lard out at the door, by the side of a basin of water, to cool. The lard and the water both froze solid that night, and the next morning I saw the frost had made a hollow in the lard and a hump in the water Frozen lard shrinks, frozen water swells! Funny frost! how you do. And out in a barn on a beam, I had one bottle with castor oil it, to oil my carriage wheels, another with neatsfoot for my harness, and another bottle full of water. They all froze up solid, one cold night, and the water bottle split, but the others did not.

Off the coast of Newfoundland and Nova Scotia, sailors often meet with icebergs a hundred feet high, and all the books say that there is nearly as much ice under the water as there is of it on top of the water, and none of that was under water at all. And yet, when I break off a piece of ice, and put it in a pitcher of water, it floats just like an iceberg, six times as much under water as there is above it.

An Indian was found dead by the roadside, one very cold morning, with an empty rum bottle beside him. He was frozen stiff. The wise Indians came and examined to find what had killed him. They decided that there had been too much water in his rum, and the water had frozen hard and killed him. Rum never freezes, but men with rum in them freeze more easily than other men who drink water only. Queer, funny frost again.

These are only a few of the curious things that frost has set me to thinking of. If any one of the readers can explain all these curious things, they will be wiser than some professors in our colleges. And professors are the wisest people I know of.—*Little Corporal.*

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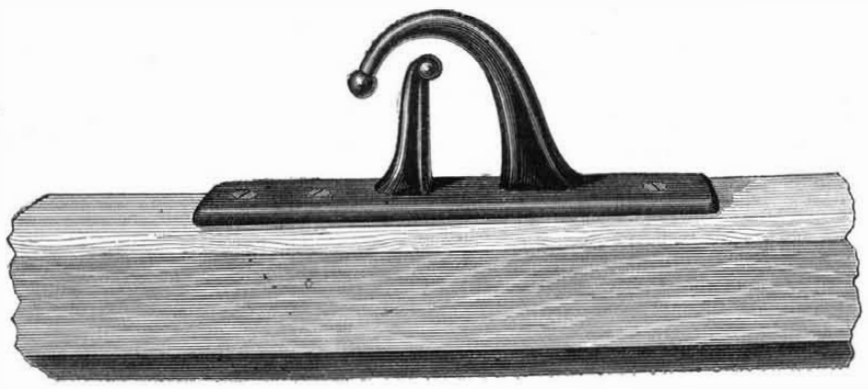
### Improvement in Holdback Hooks.

The device seen in the accompanying engraving is a combination of a post with a thill hook, intended to prevent the breeching straps from becoming accidentally unfastened, and still to offer no obstruction to their removal when desired. It is neat, and even ornamental, and its proportions give great strength with lightness. The base or plate is secured to the thill by screws, and is sufficiently long to give a good bearing, while it acts as a brace to the shaft instead of weakening it, as is often the case with other forms of hooks. It may be used either on the upper or under side of the shaft or thill.

This device was patented through the Scientific American Patent Agency, Feb. 4, 1868, by N. W. Robinson, who will dispose of state rights, or sell the whole patent. He may be addressed at Moriah, N. Y.



ROBINSON'S PATENT THILL HOOK.

### Tar Pavement Cement.

The following, patented by Albert M. Shaw, of Lebanon, N. H., differs but little from the ordinary tar cements in common use.

"I melt together tar (either coal tar or Carolina tar), Albert coal and resin, mixed in the following proportions: one hundred gallons of tar to fifty pounds each of Albert coal and resin, the same being thoroughly mixed while melted. If my pavement or flooring is laid upon the surface of the ground, I take pebble stones, sufficient to cover the surface to be paved a depth of three inches, and saturate the said stones with the above-named mixture in a heated state, and spread said pebbles over the surface to be floored to the proper depth, and roll the same down. I then take sufficient gravel to cover said surface to the depth of about one inch, and saturate the same with the same mixture, and spread it evenly over said pebble stones to the requisite depth, and roll it down. I then take sand sufficient to cover my surface to the depth of one inch, saturate the same with said mixture, and spread it evenly over the gravel coating, and roll it down smooth, and leave the same to harden. If a fine and smooth surface is required for rooms, I use ground slate instead of sand for my finishing coat, and in rooms where the flooring is not laid directly on the ground, I dispense with the lower stratum of pebble stones."

### Improved Process of Purifying Iron and Steel.

This invention consists in an improvement in the manufacture of iron and steel, by what is known as the pneumatic process, the object being to carry off the sulphur, phosphorus, and other impurities from the metal, which are not removed by that process, as ordinarily conducted. This result I effect while the metal remains in the converter, and without subjecting it to a process of reheating. Pig metal, or crude iron, which results from the process of deoxidizing the iron ore by means of a blast furnace, is highly carbonized iron, with which are mingled silicon, sulphur, phosphorus, and other impurities. The atmospheric pneumatic system consists in the removal of the excess of carbon from the metal, by subjecting it, while in a molten condition, to the direct action of an atmospheric blast, for the purpose of burning out the carbon, without the use of separate fuel for supporting combustion and producing the requisite heat. The melted crude iron is poured into a receiver, or converter, at a pressure of about 3000° F., and a blast of atmospheric air at a pressure of about twenty pounds to the square inch, is forced through the melted metal, entering at or near the bottom of the converter, and permeating the mass of molten metal therein. The mechanical effect of the passage of air through the metal is to produce violent ebullition and commotion, and the chemical effect is that the oxygen of the air unites with carbon of the iron, generating a great increase of heat, and causing a vivid combustion, the carbon of the iron serving, together with a portion of the iron, as a fuel, and the carbon being thus burned out and removed. During the process, which ordinarily takes about sixteen minutes, the heat of the metal rises rapidly, to about 5000° F., and as soon as the carbon is all consumed the blast of air is stopped, as otherwise a rapid oxidation of the metal would ensue.

This process, which is successfully employed in the manufacture of steel from crude iron, does not effect the removal of the sulphur and phosphorus, which are eliminated, if at all, by a subsequent and distinct operation. It is proposed to effect the removal of the sulphur and phosphorus from the iron while it is yet in the converter, and before it has been allowed to cool, by means of carbonic acid gas, either applied as a separate blast, immediately after the cessation of the atmospheric blast, in the pneumatic process, or by combining carbonic acid gas with the atmospheric air in that operation.

The carbonic acid gas employed in this process may be manufactured by the action of muriatic acid upon limestone, in a suitable apparatus, when it is desired to use the gas pure; but where it is employed in combination with the nitrogen of the air, it may be conveniently procured by means of a generating oven, which consists of a close-arched chamber, furnished with grating, forming a bed for coke or charcoal, which, being ignited, a stream of atmospheric air is forced, by a fan, into the closed space under the grating, or fire bed, and the air, passing through the ignited carbon, combines with it, and is converted into carbonic acid mingled with nitrogen, and is conducted to the blast cylinder.

The operation of this improvement is as follows: The atpheric pneumatic process, as ordinarily practised, is carried on substantially as before described, the valves being set so as to force atmospheric air through the melted metal in the converter. This is continued until the carbon is nearly all removed, which will be usually in about sixteen minutes, the time varying in practice with each charge of metal, according to its heat when poured into the converter, the quantity of carbon which it contains, the pressure of the blast, and other variable causes. As soon as the process of decarbonization is about completed, stop the blast of atmospheric air, and by means of the valve force a blast of the carbonic acid gas through the melted metal in the converter. This blast is continued for half a minute, more or less. Then, again, change the blast, admitting atmospheric air, which is continued for about fifteen seconds, when the blast is stopped, the operation being complete.

The result which is accomplished by this improvement may be briefly stated thus: The blast of atmospheric air being continued through the molten iron until nearly all trace of carbon has disappeared, on the introduction of the carbonic acid gas a chemical union is formed between the two equivalents of oxygen and the sulpher present in the iron, forming sulphurous acid, which passes off as gas, depositing the carbon thus set free, which may be expressed thus: $C\,O_2+S=S\,O_2+C$. A similar result takes place in respect to phosphorous present as an impurity in the iron; the oxygen of the carbonic acid combines with the phosphorous, evolving acid gases of phosphorus, and depositing carbon, thus, $2\,C\,O_2+P=P\,O_4+2\,C$, and carbon is deposited. This deposit of free carbon may be left in the iron, if preferred, in the manufacture of steel, or it may be burned out after the sulphur and phosphorus are removed, by a repetition of the atmospheric blast for a few seconds, as before stated. The oxygen of the carbonic acid gas will also combine with the iron, forming ferrous acid, thus, $C\,O_2+Fe=2\,Fe\,O+C$, the formation of the protoxide of iron setting free and depositing the carbon.

In practice, it will be found that the sulphur and phosphorus will first be expelled, and that what little carbon is deposited, will either be blown off by the blast or current of air or gas, or will unite with the ferrous acid, reducing it to iron, and forming carbonic oxide, which will be evolved as gas. While the blast of carbonic acid gas is passing through the molten iron, the temperature of the metal will fall somewhat, losing almost one fourth of the additional heat gained during the passage of the atmospheric blast. This, however, is rather an advantage than otherwise, as it is found that by the atmospheric pneumatic process, the iron is rendered almost too fluid by the extreme heat. If preferred, the carbonic acid gas may be heated before entering the converter.

A modification of the process which I have described, consists in allowing a small proportion of carbonic acid gas to enter the blast cylinder, together with the air, and thus subjecting the molten crude iron to a combined blast of atmospheric air and carbonic acid gas. By this means the impurities are removed by the process of decarbonization. Other gases or fluids may also be introduced, together with the carbonic acid gas, as may be desired. Patented by John F. Bennett, of Pittsburgh, Pa.

### Easy and Cheap Modes of Enriching the Soil.

A discussion on this subject lately held by the Bedford, N. H., Farmer's Club, is reported by the Manchester *Mirror:*

Mr. Buswell, of Auburn, gave the result of plowing in green clover, which was very satisfactory. The plowing in of a crop once in five years kept the land in a high state of fertility.

The chairman (Colonel George W. Riddle) remarked that a crop of green clover upon an acre, estimated at a ton after it is cured would be worth, standing, $10 for hay; if turned under, would be of as much value as a fertilizer as four cords of stable manure, costing $48. He considered it the best and cheapest method of enriching the soil.

John A. Riddle read a paper in regard to a new system perfected by practice in a foreign country, by a scientific agriculturist. By the use of soil of known capacity (sand), he succeeded in rendering it fertile by the application of the four well-known fertilizers: saltpeter, potash, phosphate of lime, and lime. Combined in known proportions they constituted a complete manure; with either omitted the whole was inoperative, or the results very much reduced. With one, the phosphate of lime, omitted, it was found to be impossible to produce vegetation, showing it to be absolutely indispensable, as by the addition of a trace, one one-hundred-thousandth, the plant would live. The addition of lime affected the result only ten per cent, but *humus* (vegetable mold) being added to the sand it increased forty-five per cent, although the *humus* without lime has no effect. The use of the complete manure in conjunction with complete manure less one and another of the constituent elements, would show the farmer which of these essentials his soil contains or lacks—as, if the soil contained the one omitted, its omission would have no bad effect on the succeeding crop; if it was lacking, the crop would show it.

A gentleman present stated the analysis of a fair average of barnyard manure, by Dr. Nichols, editor of the Boston *Journal of Chemistry,* and a practical farmer. It was found that, assuming a cord of manure to weigh 3000 lbs., nearly 2500 lbs. of it was simply water, more than 100 lbs. sand, and more than 300 lbs. of the balance of no more value than muck, straw or chaff—leaving only 74 lbs. of active fertilizing material, which might be carried in an ordinary basket upon the shoulder to the field. Barnyard manure may be imitated by thoroughly composting with a cord of seasoned meadow muck, 65 lbs. of crude nitrate of soda, two bushels of wood ashes, one peck of common salt, ten pounds of fine bone meal, two quarts of plaster, and ten pounds of Epsom salts. It will not cost $3.50 the cord, and ought to serve as good purpose as animal manure.

### Effect of Bright Red on Animals.

We have never yet been able to arrive at a solution of the curious effects of the sight of scarlet or brilliant orange or crimson on some animals. No treatise on natural history we ever have seen has given a satisfactory explanation of facts which must often have been noticed by the most unobservant. An exchange says:

"Many persons have unquestionably lost their lives in consequence of wearing articles of dress which provoked domesticated animals to such a pitch of fury as to lead to melancholiy results. Females, for example, in attempting to cross a pasture, wearing a red shawl, a red covering for the head, a scarlet dress, or flowing scarlet ribbons, where bulls are grazing hazard their lives. Oxen, otherwise peaceably disposed, become intensely infuriated at some seasons by the sight of bright red handkerchiefs, or almost any article of female dress of that particular hue. It is equally curious that turkeys manifest the same restlessness and ultimate excitement at red flags or red dresses. The turkey cock on such occasions assumes extraordinary dignity, gobbling most uproariously, and creating immense excitement in his family, not accustomed to the sight. Nearly all the wild grazing animals exhibit extreme surprise, if not positive fright, when a red cloth floats before them."

## Correspondence.

*The Editors are not responsible for the opinions expressed by their correspondents.*

### Bridge Piers and Floating Ice.

MESSRS. EDITORS:—As you were kind enough to publish some remarks I made a few days since, respecting canal navigation, etc., I will, at the risk of fatiguing your readers, submit some suggestions as to the best method of building bridge piers in streams where large masses of floating ice run at certain seasons of the year. You are undoubtedly aware that bridge piers are usually built with their up stream face, or cut-water, at an angle of not over twenty degrees from where the inclination or bevil commences to the top of the pier. With this slight angle, a field of ice will press upon or strike the pier with as much force as though it stood perpendicular to the surface of the water. If the piers are sufficiently strong to withstand the first field of ice, those which follow either mount upon or slide under it, until a perfect dam is erected, which floods the adjacent country, to the great destruction of property, as is too often seen. It is not unfrequently the case that piers give way, taking bridge and all with them, as recently reported of the Rock Island railroad bridge, at Davenport, Iowa. All this can easily be obviated by building the piers with their upper, or cut-water face, at a greater angle from the perpendicular. If that angle is made at forty-five or fifty degrees, and the cutting face is contracted to a moderately sharp edge, and is built from a few feet below "low-water mark," with a reasonably hard stone laid so as to present the appearance of a "flight of stairs," with the steps from twelve to fifteen inches high, by about three inches deep; an "inclined plane" is made, on which the thickest fields of ice will be forced. When the ice slides upon this "stone saw," if I may so call it, its weight will naturally cause it to crack; but when the cutting of the "saw," as the current drives it on, is added to the tendency to break, there is nothing to prevent its being torn asunder and passing down stream on its harmless way.

A little reflection will show that a considerable portion of the force of the ice is nearly vertical upon the plane of the pier, which rather holds it in its place than otherwise; while the steady, sliding motion up the plane prevents any shock whatever to the pier itself. The first piers of this kind were built by the late Mr. Stevenson, for the Victoria Bridge at Montreal, where the St. Lawrence is nearly two miles wide, and runs fully ten miles the hour. Fields of ice a mile square by from two to three feet thick, can there be seen, at times sawed into pieces or stripes, almost as systematically as though they had been cut for some mammoth ice house.

My object in thus calling attention to this subject is, that as I see your system of railroads is pushing itself far across the continent to the west—your great Mississippi and Missouri rivers will probably be crossed by numerous bridges, it occurs to me if engineers will examine Mr. Stevenson's work at Montreal, when the ice is running in the early spring, they

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will need no other argument to convince them of the strength and ability of the pier I have endeavored to describe.

New York city. ENGINEER.

For the Scientific American.

## HOW A SNOW FLAKE IS BUILT.

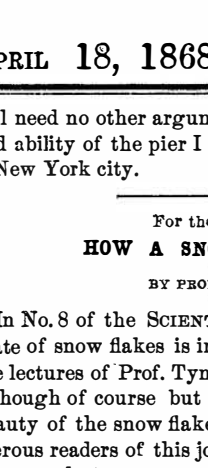
BY PROF. GUSTAVUS HINRICHS.

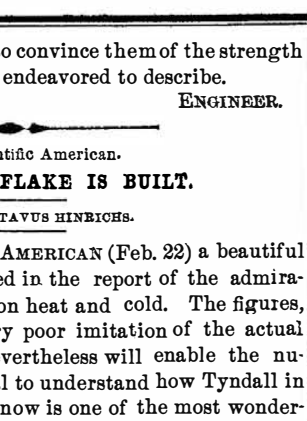
In No. 8 of the SCIENTIFIC AMERICAN (Feb. 22) a beautiful plate of snow flakes is inserted in the report of the admirable lectures of Prof. Tyndall on heat and cold. The figures, although of course but a very poor imitation of the actual beauty of the snow flakes, nevertheless will enable the numerous readers of this journal to understand how Tyndall in the same lecture can say: "Snow is one of the most wonderful and beautiful things in the whole world."

I believe that Kepler, the great astronomer, is considered the first who called the attention of scientific men to their beautiful and most regular form. Since then they have been studied very accurately; many hundred plates filled with the various forms observed have been published. But never has the cause of these forms been satisfactorily accounted for in a simple manner; indeed the explanation of these forms has hardly ever been attempted. Still, every one in beholding these forms, cannot help being convinced that they are the expression or the result of some grand universal law, just as the spherical form of the heavenly bodies is the expression of the law of gravitation.

In my "Atomechanics," published last year for distribution to the various institutions of learning in this country and in Europe (see the London *Mechanics' Magazine*, Dec. 27, 1867)) these forms find their simple explanation in connection with the other crystalline forms exhibited by matter everywhere. It may not be without interest to give a somewhat more detailed, simple account of this explanation here. The explanation is based upon the known chemical composition of the substance itself; and as this may not be sufficiently plain to all of the readers, we shall present a concise account of that also.

Snow is crystallized water. But what is water? By passing a galvanic current through water, Nicholson and Carlisle discovered in 1800 that water was decomposed into two different gases. Fig. 1.) The gas collecting above the positive pole was found to support combustion; a glowing taper immersed into it bursts into a bright flame; hence it is oxygen. At the negative pole there collects a gas which burns with a pale bluish flame, producing water again as the result of this combustion; it is therefore hydrogen. Furthermore, it is readily ascertained that for every one measure of oxygen




produced in the one tube, O, there are exactly two measures of hydrogen evolved in the tube, H. Water is by this experiment proved to consist of oxygen and hydrogen in the proportion of one measure of the former to two measures of the latter. This has been represented in Fig. 2, where each measure is represented by an equal square, and H standing for hydrogen, O for oxygen.

Now matter, bodies, are made up of parts; the smallest parts or particles are often called atoms. The atoms themselves cannot be supposed to change; hence, since the size of the bodies, particularly gaseous bodies, changes very much, expanding and contracting often to an enormous extent, the atoms themselves are considered to be relatively at great distances from one another. Thus in Fig. 2 the two squares represent the two measures or volumes occupied by two hydrogen atoms; these particles themselves actually filling but a minute portion of this space, as indicated by the dot in the middle of the squares. That the spaces between the atoms (or the interatomic spaces, Tyndall, tenth lecture on heat as a mode of motion) are really so great, we may readily understand if we remember that the water atoms contained in one cubic inch of water will occupy a cubic foot, or nearly two thousand times as much space when the water is converted into steam. We meet here the same fact as in astronomy; the space actually occupied by the sun and planets is entirely insignificant as compared to the space allotted to them for their motions; in other words, the universe is not densely populated by either cosmical atoms in the heavens or chemical atoms in any substance. The question, how the atoms manage to keep other particles out of their great domains, is usually answered, by the vibratory motions of heat; the atoms vibrating to and fro so energetically and rapidly that they actually would kick out any neighboring atom that might happen to get within the space allotted to them.

But furthermore, chemists consider it proved that all elementary atoms occupy equal spaces when the elements are in the gaseous condition. Thus the two volumes or measures of hydrogen obtained from the water would represent two particles or atoms of hydrogen; so also the one measure of oxygen will represent one atom of oxygen. In other words, we learn from the decomposition of water by the galvanic current, that each atom of water consists of two atoms of hydrogen and one atom of oxygen.

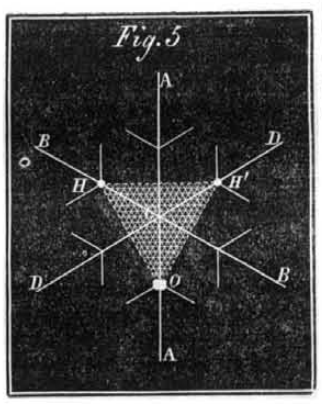
In Fig. 2 these atoms are represented as still uncombined, a mere mixture of oxygen and hydrogen; when actually combined to water-atoms it is known that the three measures have condensed to but two, as represented in Fig. 3. For we know that one volume or measure of oxygen weighs 16 times as much as an equal volume of hydrogen, while water, as steam, weighs exactly 9 times as much as an equal volume of hydrogen. If we call the weight of one measure of hydrogen 1, the weight of one volume or atom of oxygen is therefore 16, the weight of one volume of water=9. But one atom of water, consisting of 1 volume of oxygen (weighing 16) and 2 volumes of hydrogen (weighing 1 each), does weigh 16+2, or 18. Since now, one volume of steam weighs only 9, it follows that one atom of water or steam occupies two such volumes, as represented in Fig. 3. It is readily seen by a comparison of Fig. 2 and Fig. 3, that this chemical paradox, viz., that 2 volumes, H, and 1 volume, O, give not 3 volumes, but only two volumes of steam, may be understood by supposing the two atoms of hydrogen in the act of combination to be brought inside of one volume, which in being placed together with one of oxygen, gives the two of steam, Fig. 3.

In the preceding we have given nothing but the actual facts (excepting the last explanation of the reduction of the three to two volumes). This must enable us to explain the form of the snow flakes.

A snow flake is but a great collection of water-atoms, arranged according to the form of these atoms. What is that form?

We have seen that each water-atom (Fig. 3) is composed of three little particles, two being the hydrogen atoms, the third being an oxygen atom. But three particles always form a triangle (Fig. 4); and since two of these particles, H and H′, or weights are equal, the third, O, will sustain the same relative position to either of them, or the triangle, H O H′, must necessarily be isoceles; that is OH=OH′. And since now the atoms, even when combined, are at great distances from one another, the most complete position of equilibrium will be attained; that is, the equal sides, OH and OH′, will be equal to the base, HH′, or the triangle, H O H′, is equilateral.

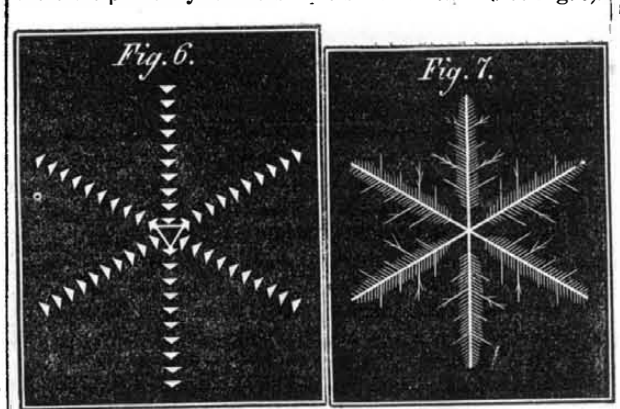
The form of a water atom is therefore necessarily an isoceles triangle, and probably an equilateral triangle. In the latter case it has three equal axes at angles of 60° in the plane of the triangle. This is represented in Fig. 5, where AA, BB, DD, are these three axes, dividing the plane of the water atom equally.




But after having obtained the form of the atom of water, the further question arises: How will the atoms of water arrange themselve when perfectly free to move? It must of course be remembered that they never are actually in contact, for the spaces between the atoms never are nothing.

Suppose, then, there were a great number of water atoms freely moving in space, that is, a space is occupied with little triangles (Fig. 4), the base, H H′, of which weighs 2, the vertex, O, of which weighs 16. They will therefore, under the influence of any force whatever, be directed all parallel to one another. To illustrate this, take equal and equilateral triangles cut out of pasteboard, fix (by means of a little beeswax) one shot at each of two of the corners, but 16 shot of the same size at the third corner. Now let these all drop—that is, be subjected to the force of gravity; all corners with 16 shot, or representing our oxygen corner, O, in Figs. 4 and 5, will point downward, all sides, H H′, will be exactly horizontal. Again, let them furthermore be exposed to a strong current of air: the parallelism of the triangles will remain, though the direction itself will of course depend upon the direction of the blast.

Hence the atoms of water will, when by sufficient and gradually applied cold, they are made to approach one another, be arranged perfectly parallel to one another, and therefore primarily form a simple six sided star. (See Fig. 6).




But any atom in these atoms may again become the center for others, so that forms like Fig. 7 and all other observed forms of snow flakes result.

Even the solid, compact ice is built up in the same way. This has been shown by the beautiful experiment of Tyndall described in his fourth lecture on heat as a mode of motion. In thawing, he showed that similar perfectly regular six-sided stars are formed in the ice.

In conclusion, we will add the description of the snow flakes given by Tyndall in the sixth lecture referred to. By a glance at our figures it will be seen how well our theory accounts for their wonderful forms. Tyndall says:

"Snow, perfectly formed, is not an irregular aggregate of ice particles; in a calm atmosphere the aqueous atoms arrange themselves so as to form the most exquisite figures. You have seen those six-petaled flowers which form themselves within a solid block of ice when a beam of heat is sent through it. The snow crystals formed in a calm atmosphere are built upon the same type; the molecules arrange themselves to form hexagonal stars. From a central nucleus shoot six spicula, every two of which are separated by an angle of 60°. From these central ribs smaller spicula shoot right and and left with unerring fidelity to the angle 60°, and from these again other smaller ones diverge at the same angle. The six-leaved blossoms assume the most wonderful variety of form; their tracery is of the finest frozen gauze, and round about their corners other rosettes of smaller dimensions often cling. Beauty is superposed upon beauty, as if Nature, once committed to her task, took delight in showing, even within the narrowest limits, the wealth of her resources."

But there is still one point more which in this connection may readily be explained. According to my "Atomechanics," an oxygen atom—the part here considered solid, O, in Fig. 4 is composed of a group of 32 little particles; each hydrogen atom consists of only two such particles. Suppose now that the water atom represented in Fig. 4 was exposed to a rapid and powerful current of the ether, which according to Tyndall and modern physicists generally, occupies the space between the atoms. Then the oxygen atoms would be blown away in the direction of the current, just like the chaff is blown away from the grain; in other words, this constitution accounts for the decomposition of water by the galvanic current, the oxygen goes in the direction of the flow, or with the current, because its atoms offer the greatest resistance to that current on account of their structure.

It will be seen from this short exposition that "Atomechanics" explains "how the snow flakes are built up," explains a fact which all philosophers unite in declaring one of the most wonderful and mysterious in nature! And Atomechanics does this not by introducing at every turn some new auxiliary hypothesis; but by means of only one principle, that all elements are composed of one substance, pantogen. Perhaps we may at other times present some other points of Atomechanics to the readers of this journal.

Iowa City, March, 1868.

### Improvement in Hand Printing Presses.

MESSRS. EDITORS:—I notice in the SCIENTIFIC AMERICAN of March 21st, an inquiry why there are no improvements in hand printing presses, by Mr. Gabe of Bloomington, Indiana. In reply, I wish to say that the proprietor of the *Gazette* office, at this place, and another gentleman, have perfected a very valuable improvement on hand presses, and it will soon be patented and offered to the public. The proprietor of the *Gazette* has attached the improvement to his double-medium Washington press, given it a thorough trial, and it proves a complete success. It greatly lessens the labor of press work, and doubles the speed of the same. The cost of the improvement is trifling, and it is capable of being attached to all hand printing presses in a few minutes. The patent is now being applied for, through your agency, I believe.

Adriance, Ind., March 23, 1868. K. L.

### Improvement in the Manufacture of Molded Articles.

Patented by William B. Gleason, Boston, Mass.

"Having a matrix or mold of the form of the article to be produced, I take thin veneers or shavings and moisten them by hot water or steam. The veneers I lay in the mold, and then press into the space in the mold upon the veneer, any suitable plastic adhesive compound that will afterward set and become hard. The plastic material which is forced by the action of a press into the mold, acts upon the thin veneer as a punch or die, which is the reverse of the mold, and causes the veneer to fit all parts thereof, while, by reason of the plastic nature of the filling or backing, the contact between it and the veneering is made perfect, and at the same time the adhesive nature of the compound insures the union of the facing to the backing.

In some cases, where, from sharp angles or abrupt projections or depressions in the mold, there is danger of breakage or separation of the veneer or shaving, I make use of more than one thickness, which increases the chances of there being at the points of breakage at least one unbroken portion of wood. When the veneered object is dry and hard, all of the shavings, where more than one thickness is used, that come immediately into contact with the filling, will adhere to the filling and the layers not adhering may be removed. I am aware that thin substances have been shaped to form by the action of hard, solid punches, which press such substances into molds suited to the punches, which forms or shells have been afterward backed or filled with plaster or other material. My invention, however, differs from the matter just referred to, and it may be said to consist in the process of forming in molds articles which are covered with an adhering pellicle, by pressing the pellicle into the mold by an adhesive plastic substance or compound, as well as in articles so molded."

### Curious Habits of the Chlamyder.

Among the recent French publications is a highly entertaining work by M. Pouchet, Director of the Museum of Natural History of Rouen and correspondent of the Academy of Sciences. The book is a disconnected collection of curiosities in nature, which our author has compiled and published

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with the comprehensive title of "The Universe." One of the most interesting parts of M. Pouchet's work is that which treats of the architecture of birds, and under this head appears a somewhat marvellous description of the habits of a peculiar species of the feathered tribes, who apparently prefer elegance of external adornment in their nests rather than shelter for the protection of their brood. The speckled chlamyder is an exotic bird, resembling our partridge, but distinguished from it by its deep color relieved by clear spots, and by its neck, which is adorned with a red collar. For the location of their nest, the couple choose an open place exposed to the sun and to the light. Their first care is to make a path of round pebbles; when they deem it to be sufficiently thick, they begin by planting in it a little avenue of branches. They are seen for this purpose to bring from the country slender shoots of trees of about the same size, which they thrust solidly by the thick end into the interstices of the stones. These branches are disposed in two parallel rows, converging a little in such a manner that they form a miniature shrubbery. The plantation is a yard in length, and is sufficiently wide to allow the two birds to walk alongside of each other in the interior. This grove being finished, they devote themselves to embellishing it. Each starts out foraging in the fields, and brings back all the sparkling objects it can pick up—pearl shells, birds' feathers, all that charms the eye. These trophies are suspended at the entrance to the grove, which soon begins to shine in the sun like a palace of the Arabian Nights. In the places frequented by the chlamders, if a traveler loses his watch, his knife, his seal, he does not spend his time looking for it on the ground; he knows where to find it. The discovery of these facts appeared so extraordinary to Mr. Gould, who first described them, that he feared to meet in Europe only with unbelievers. To answer beforehand all objections, he had one of these wonderful shrubberies taken up, and succeeded in transporting it to the British Museum, where it can be seen to-day. A little later, a living chlamyder was brought to the zoölogical gardens of London. He was placed in a large room in the midst of all the materials necessary for his constructions; but the poor exile only made a shabby work of it. He scarcely touched the branches, to plant a few here and there in a heap of stones. He wanted the air and the sun; he wanted especially a companion.

## DISSOLVING ANILINE COLORS.

For the application of most of the aniline colors, more especially blues and violets, consumers are obliged to make use of special solvents either to prepare them for the dye-bath or for printing. The solvents mostly employed are alcohol, wood spirit, and acetic acid. These solvents, seeing the quantity one is obliged to use (from two to five gallons per pound of color), are very costly, and the best means ought to be used either to diminish the quantity employed or dispense with them altogether. Many ways have been proposed. The first consists in modifying chemically the colors, especially blues and violets, by the action of concentrated sulphuric acid or the action of alkali.

The action of alkalies has given birth to the isolation of the bases of violets and blues of aniline and the formation of soluble salts by the saturation of this base with an acid.

The action of concentrated sulphuric acid has resulted in the following processes:

Nicholson heats one part of blue or violet of aniline with four parts of sulphuric acid 66° Baumé to 230° Fah., and keeps it at that temperature till the color is entirely soluble in water; the time is generally about 45 minutes.

Clavel pours (a little at a time) Nordhausen fuming acid upon the colors, stirring all the time. After the repose of half an hour the mixture is run carefully into water saturated by an alkali which precipitates the color completely soluble in water.

M. Monet, of Lyons, mixes one part blue of aniline with one part sulphate of aniline; he takes one part of this mixture or one part of violet insoluble in water, and adds it to six parts of sulphuric acid 66°, heats gradually to 160° Centigrade, takes out the fire, and adds alkali till an alkaline reaction is shown, and the color precipitates. After washing one part of this color is soluble in 200 parts water.

The second means consists in replacing alcohol by vegetable emulsions, or by solutions emulsive of special products much less costly than alcohol.

These means have originated the processes of M. Gaulbier de Clanbry and of MM. Lailler and Dumesnil, of Rouen. The process of M. Gaulbier de Clanbry was patented in England and France in 1864, and according to his patent a large number of substances give to water the property of dissolving the colors which to that time could only be dissolved by alcohol or substances as inconvenient. His invention consists in the substitution for the alcohol and other solvents hitherto employed for dissolving the coloring matters obtained from aniline which are insoluble in water, such substances or any substances which shall possess the property of forming a mucilagenous, gelatinous, or sopanaceous solution when mixed with water, or of thickening water so as to render it mucilagenous, gelatinous, sopanaceous, or sirupy. As examples of such substances, especial mention may be made of the following: Starch or other fecula, gums, gelatine or glue, concentrated decoctions of the bark or rind known in Panama (*guillaya saponaria*) of the rose tribe, the soapwort of Egypt, the root of the marsh mallow, mucilage prepared from the plants or the seeds of the mallow, lily and orchis tribes, from lichens, fucus or sea wrack, and the seeds of the quince. He also mentions that other substances, though not possessing the properties of rendering water mucilaginous, gelatinous, or soponaceous or sirupy may be employed, such as glucose and glycerin. The dyeing is effected by the solutions hereinbefore described, in the same manner as when alcohol is used, but with the advantage in favor of the improved mode of preparation that the solvents do not volatilize like alcohol, and uniformity of tint is readily obtained. In the baths the fibers take up by their own action the colors which remain constantly in a state of solution, and consequently fabrics or fibrous substances dyed by this process do not lose any of their color by friction.

It is said that M. Gaulbier de Clanbry has ceded the working of this process to the house of Coly, of St. Denis. For dyeing or printing this process is probably more adapted to the violets than the blues, and has not yet acquired a very large practical importance except in the manufacture of lakes, to which it appears specially suitable. As a solvent for the aniline colors employed for this purpose gums and glue, etc., have been extensively used for some time in this country as well as in England and France. The process of MM. Lailler and Dumesnil is somewhat similar to the preceding.

The third means was patented in England and France by Mr. Leonhart, of Manchester, in 1864, and consists in reducing the colors of aniline into a state of extreme division and introducing them in this state into the dye-bath without any solvent. To obtain this result the colors are completely dissolved in alcohol. The alcohol solution is run drop by drop into cold water, which is rapidly agitated. The precipitated mass is drained or filtered and well washed and the liquid is distilled to recover the alcohol, which can be used again and the paste can be employed directly in dyeing or printing

The last plan is due to the intelligence of MM. Rangod, Pechiney and Ach Bulard. They dissolve in cold sulphuric acid of 66° blues and violets of aniline, one part of color to six or twelve parts of acid. When all is dissolved this solution is poured into a quantity of water sufficient to determine the total precipitation, about fifteen or twenty times the weight of acid employed. The water must be well agitated and kept cool during the mixing. The precipitate, separated from the liquid and well washed, is used in the state of carmine and is applicable direct to dyeing and printing.

It is well known that the process of Rangod, Pechiney, and Bulard has given excellent results in dyeing quantities of wool, and it is truly inexplicable that the process is not yet generally applied. That the employment of alcoholic solvents, so very costly, is not abolished, is not the want of a means to arrive at the result, but only the non-application of that means.

## Editorial Summary.

A New Oil Tester.—For testing the relative value of various oils used as machinery lubricants, there is, as far as we know, no perfectly reliable instrument in existence. Until a recent period the specific gravity alone has furnished a guide in determining the value in this respect of standard oils, but of late years the nearly interminable variety of oils that have been introduced, causes the test to be nearly useless. An English patent has lately been granted for a new apparatus, constructed on the principle that the best oil is the one which allows the greatest number of revolutions to be performed by a shaft with the least possible increase of temperature of the bearings, and that all others may be graded on a descending scale as to value, according as they fail to approach the standard.

Recipes for Welding Iron and Steel.—For welding iron and steel a composition has lately been patented in Belgium, consisting of iron filings, 1,000 parts; borax, 500; balsam of copaiva, or some other resinous oil, 50; and salammoniac, 75. They are mixed, heated, and pulverized. The process of uniting the iron and steel is as usual. The parts are heated to a cherry red, covered with the preparation, brought together, again heated and welded.

Another composition for the same purpose is 15 parts of borax, 2 of salammoniac, and 2 of prussiate of potash. Being dissolved in water, the water should be gradually evaporated at a low temperature.

Telegraphing by Touch.—A correspondent, a telegraph operator, proposes to have the blind taught to read telegraphic signals by touch and sound, and those who are deaf as well as blind by touch alone. His plan appears to be feasible, and this widening of the bounds which now hem in our suffering fellows would no doubt meet the approval of those who have the care of them. We do not think, however, that reading telegraphic signals by touch is novel; as we have several times seen the feat performed. But its introduction into our deaf and dumb asylums would be a work of mercy. The apparatus, as our correspondent shows, would be simple and cheap, and it might be applied to a variety of uses.

A Valuable Fossil.—Professor O. M. Marsh has secured and presented to the Yale College Cabinet, probably the largest fossil elk in existence. Some sixteen years ago, there were imported from Ireland the fossil remains of four of these gigantic, post-tertiary animals. On their arrival in this country, these fossils were stored in a commission house in Philadelphia until a few weeks since, when they were sold at auction. The one secured for the Yale collection measures in the span of its antlers, thirteen feet, two inches. The others were of smaller size, and were sold, one to the Smithsonian Institute, one to the Philadelphia Academy of Natural Sciences, and the remaining one to Prof. Marsh.

In the open air, under ordinary pressure, sound travels at the rate of 1,090 feet per second, while in tubes 3½ feet in diameter, the rate is found to be 1,083 feet, and to decrease rapidly with the diameter.

## MANUFACTURING, MINING, AND RAILROAD ITEMS.

In Southern France the railways are seriously embarrassed every winter by snow drifts filling the deep cuttings, but the past season a section of the line of railway from Saint Etienne to Annoway, has been kept open by the judicious planting along the banks on either side of the track of pine trees a system of treatment previously adopted in arresting the *dunes*, or inroads of sea sands, which in many parts of France used to annually cause great damage.

A correspondent writes that the yield of the Catasauqua furnace, 240 tuns of iron in one week, has been surpassed by three furnaces in New York State. The "Fort Edward Furnace" has frequently made ever 280 tuns per week, while one of the Messrs. Burden's Furnaces, during the month of March, 1867, averaged 269½ tuns per week, mostly of soft iron.

The hydrographic survey now going on in Maine, has already shown that the State has 1,955 sites of water power, with a working energy of 300,000 horse power, equal to a force of 4,000,000 men, and nearly twice that of the working energy, both by steam and water, of Great Britain and Ireland. This water power is scattered through every section of the State. Owing to the body of water in the 1,568 lakes, which form large reservoirs, and cover 2,441 square miles, the force of the streams flowing from them is more uniform throughout the year than elsewhere in the United States.

The Sierra Nevada mountains are crossed by the Central Pacific railroad, 100 miles from tide water, at an elevation of 7,042 feet. There are in the passage fifteen tunnels, and the blasting powder alone for the rock excavations has cost $1,000,000 in gold.

A company has just been organized in Chicago for the purpose of constructing two blast furnaces near that city, with a capacity of fifty tuns per day. The iron ore of the Lake Superior region will be smelted with the coal recently discovered in Central Illinois, which has been tested and found to be well adapted to the purpose of iron working.

Utah Territory is known to abound in many of the useful, and it is believed also, precious metals. Coal of fair quality and a considerable quantity, has been found in various parts of the territory, and iron has for years past been mined in the Southern counties. On the western slope of the Wasatch mountains, about twenty-eight miles from Salt Lake City, is a canyon known as "Little Cottonwood." Valuable ores of iron, principally magnetic and hematite, abound in this canyon, but as yet no attempts have been made to work them into mines. There are also found argentiferous galena, fahlerz copper, silver gland, and other ores of silver. One ledge of argentiferous galena, called the "North Star," has been prospected by a tunnel 60 feet in length, from which about 400 tuns have been taken out. The vein is about ten feet thick, and carries galena which assays $100 per tun. The ore produced in this and neighboring ledges may be readily reduced by smelting, and requires no preparatory roasting.

The new railroad from Logansport to Union City, Ind., ninety-two miles in length, has, it is said, only four curves on the entire line. It forms the connecting link in a new and through route from Chicago to the Atlantic cities

It appears that at the close of 1867, four miles and 5,035 feet of the Mount Cenis tunnel had been completed, leaving two miles and 4,018 feet still to be pierced. The distance pierced in 1867 was 5,040 feet, as compared with 3,416 feet in 1866, 4,079 feet in 1865, and 1,144 feet in 1860. The outlay, during ten years, upon the work, amounted at the close of 1867 to about $8,000,000. The year 1871, it is expected, will witness the completion of the tunnel. Its total length when finished will be seven miles, 3,773 feet, and its total cost is estimated to reach the sum of $12,000,000, or something more than $1,500,000 per mile.

## Recent American and Foreign Patents.

*Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.*

Process for Removing Impurities from Malt Liquors.—George Storey, Wheeling, West Va.—This invention relates to a new process for removing the impure and decomposing properties of malt liquors, by means of freezing.

Hay Raker and Loader.—Orrin Luce, Virgil, N. Y.—In this invention an improved adjustable device is employed for clearing the teeth, and conveying the hay to the elevator, and in connection with it other novel devices are employed for raising and lowering the teeth and the clearing apparatus.

Limb and Basket Holder.—Wm. Richardson, Baltimore, Md.—This device is a cheap and convenient instrument by which the fruit-gatherer can draw a distant limb near to him, and confine it in that position till he has secured its fruit. When not thus in use it can be employed to hold the fruit basket.

Machine for Tonguing, Grooving, etc.—Alexander McCreight, Tranquility, Ohio.—The present invention relates to a machine, the construction and arrangement of which is such that wood, properly fed into the same can be tongued or grooved, for producing either plain or fancy, or figured moldings, for use upon wood work of all kinds, or for forming panels or door frames, finishing sash frames, and, in general, for all purposes of ornamenting or relieving the surface of wood.

Artificial Leg.—Albert Strasser, Montgomery, Ala.—The present invention relates to artificial legs, when the leg is amputated at or above the knee.

Lamp Chimney.—William Onions, and Henry Roberts, St. Louis, Mo.—This invention relates to a new and improved lamp chimney, of that class which are composed of glass and metal—a glass lower portion, and a metal upper portion. The invention consists in a new and improved means for securing the metal to the glass portion of the chimney, whereby the latter is prevented from breaking under the expansion of the former, a contingency of frequent occurrence with chimneys of this class.

Shuttle.—Ezra P. Marble, Sutten, Mass.—This invention relates to a new and improved application of a spring to the spindle of a shuttle, whereby the spring is fully concealed, and entirely out of the way, so that when the shuttle is in use the spring cannot catch and cut or break the threads either of the warp or filling.

Carriage Wheel.—Levi Adams, Amherst, Mass.—This invention relates to a new and useful improvement in the construction of carriage wheels, whereby a wheel much stronger than usual is obtained, and one which will effectually preclude the locking of vehicles together, when coming in contact in passing each other.

Draft Regulator.—Jos. W. Branham, Franklin, Ind.—This invention relates to a new and improved method of constructing dampers or draft regulators for furnaces, whereby the draft is more nicely regulated, and whereby they are more fire proof.

Lever Purchase.—J. B. Case, Fletcher, Vt.—This invention relates to a new and improved method of constructing a support for the fulcrum of levers, and of combining the lever therewith, whereby a motion of the arms o a lever is permitted in any direction.

Back and Abdominal Supporter.—Mrs. John Ford, Salem, Oregon.—The present invention relates to a supporter for the back and abdomen, and is more especially intended for use by women, both before and after confinement, as well also as a means of relief and cure for the falling of the womb, and other similar diseases with women.

Match Box.—J. Kirchfeld, and F. Heyl, Riegelsville, Pa.—This invention relates to a new and improved match box for the use of tobacco smokers, and designed to be carried in the pocket for the purpose of holding friction watches and a fuse. The box is also supplied with a cutter for chopping the ends of cigars preparatory to lighting them. The invention consists in a novel construction of a box, the peculiar application of certain parts to it, etc., whereby a very convenient article for the purpose specified is obtained.

Means for Increasing the Production of Honey with the Ordinary Beehives.—A. J. Smith, and H. C. Reed, Decorah, Iowa.—This invention relates to a new and improved means for preventing the frequent swarming of bees, and, consequently, securing an increased amount of surplus honey from them.

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RAKING DEVICE FOR HARVESTER.—Antony Shebanck, Cleveland, Ohio.—This invention relates to a new and improved automatic raking device for harvesters, and it consists in a new and improved means employed for operating the rake, moving it forward and backward over a segment or quadrant-shaped platform, so that it will have, during said movement, a rising and falling motion; falling when the rake arrives at the front edge of the platform, so that it may work low over the same, from front to rear, and sweep or rake the cut grain therefrom, and rise at the rear end of the platform, and pass over the same from the rear to the front, in an elevated position, so as not to interfere with the cut grain thereon.

PLOW.—Mathias Penning, Leavenworth City, Kansas.—This invention consists in forming the colter in one continuous piece with a landside and shear extension, which is bolted to the mold board, by which arrangement the plow is made to operate in a more easy and efficacious manner.

COMBINED REEL AND SPINNING WHEEL.—G. Bradway and N. Bradley, Maquoketa, Iowa.—This invention relates to a combination of a reel with an ordinary spinning wheel, by attaching reel heads to the spokes of the wheel and connecting worm-wheel gearing for making the cut of yarn.

LACING AND FASTENING BOOTS AND SHOES.—Wm. Banister and Albert H. Rowell, Mass.—The object of this invention is to enable the lace or string to be pulled tight throughout its length by one motion, and also an improved method of securing the lace.

MANUFACTURE OF SPOTTED AND CLOUDED YARN.—John W. Bentley, Woonsocket, R. I.—This invention relates to an improvement in the manufacture of clouded or spotted yarn.

GAS FIXTURE.—Emory McClintock, New Brunswick, N. J.—This invention relates to a new device whereby the ordinary gas cock is dispensed with in gas fixtures for illuminating purposes, as for instance gas brackets for rooms and for other positions where gas fixtures are arranged for illuminating purposes.

SAW SET.—James F. Broadhead, Rondout, N. Y.—This invention relates to a new and improved method of constructing machines for setting saws.

STEAM JET HEAD FOR CLEANING BOILER TUBES AND FLUES.—Joel M. Wheeler, Oxford, Conn.—This invention relates to a new and improved method of formmg "heads" for producing steam jets for cleaning the tubes and flues of steam boilers, where the same is made applicable to all horizontal tubular or flue boilers.

MACHINE FOR CLEANING BURRS FROM HAIR.—F. Walpert, Baltimore, Md.—This invention relates to an improved machine for cleaning burrs from the hair of the tails of horses and other animals.

DEVICE FOR SETTING WHEELS ON AXLES.—M. S. Wilcox, Union Mills, Ind.—This invention relates to a new and useful device for determining the exact length and also the pitch or set of axles for wagons and other vehicles.

OPERATING ROCK DRILLS AND STEAM CUT-OFF.—James H. Thomas, Lacon, Ill.—This invention relates to a new and improved method of operating rock drills, and to the manner in which the steam engine ports are opened and closed.

ROCKING CHAIRS AND CRADLES.—S. E. Martin, Shamokin, Pa.—This invention relates to an improvement in rocking chairs and cradles, rocking horses, and like contrivances, and consists in the application of a sole of gutta percha, india rubber, or other elastic gum, or of soft leather, to the rockers, rendering the rocking more easy and noiseless, preserving the carpets from wear and tear, and being also more economical in use than the reckers now adopted.

RAILROAD CHAIR.—Arcule Elms, North Granville, N. Y.—This invention relates to the manner of fastening the two parts of a railroad chair together in a simple and effective manner by a book lock device.

UMBRELLA RUNNER.—Wm. Lang, Brooklyn, E D., N. Y.—The object of this invention is to provide a runner for umbrella rods, which shall be simple, elegant, and more convenient to operate than those heretofore made. It consists in providing a spring lever which operates crosswise of the runner, together with other devices conducing to the perfect operation of the runner.

END GATE FOR WAGON.—Enos S. Miller, Baltimore, Ohio.—The object of this invention is to provide an end gate for a wagon box which shall serve both as an end gate and a feed trough, as occasion may demand.

BREAST PAD.—Daniel K. Wertman, Centralia, Pa.—This invention relates to breast collars for harnesses and consists of tin pads stiffened by sheet metal plates and attached to the breast strap, whereby a breast strap or collar is obtained which is superior in many points to the breast collars heretofore made.

GATES.—Elias Roth, New Oxford, Pa.—This invention has for its object to furnish an improvement in the means for opening, closing and fastening gates, so that they may be opened and closed without its being necessary for the driver to get out of the carriage, or from any desired distance from the gate.

BOOKBINDER'S ROLL.—John Feely. New York city,—This invention relates to a new manner of securing the type to a roller and handle, for the purpose of producing an ornamenting or gilding bookbinder's roll, in which the type can be easily removed and replaced whenever desired.

BABY JUMPER.—John H. Coldwell, Poughkeepsie, N. Y.—This invention relates to a new baby jumper. in which arms projecting from the straight seat-bar are pivoted to arms projecting from the base, the arms on the seat-bar being adjustable, so that the fulcrum can be brought nearer to or further from the seat, and so that thereby the apparatus can be adapted for more or less heavy children.

MILK STIRRER.—Joel H, Soule, Georgetown, N. Y.—This invention has for its object to furnish an improved, self-acting machine, by means of which milk may be stirred in cheese factories and elsewhere, to keep the cream from rising during the night. or while said milk is standing.

WAGON JACK.—T. L. Gable, Orange, N. Y.—This invention has for its object to improve the construction of the improved wagon jack, patented by the same inventor April, 30, 1867, and numbered 64,302, so as to make it more convenient and effective in operation.

HAY COCKING AND TEDDING MACHINE.—R. T. Dill, Poughkeepsie, N. Y.—This invention has for its object to furnish an improved machine, by which hay may be cocked or tedded rapidly, conveniently, and thoroughly.

MACHINE FOR BENDING CARRIAGE CIRCLES.—S. S. Daniels, Kendallville, Ind.—This invention has for its object to furnish a simple, convenient, and effective machine for bending carriage circles.

WELTING OR CORDING ATTACHMENT FOR SEWING MACHINES.—Francis B. Contessa, New York city.—This invention consists in attaching to the ordinary foot-pad bar a curved roller, and in adjusting thereon an elastic ring, whereby the machine is adapted to the process of cording and welting generally, and especially to stitching or sewing on the lace or braid shoulder straps and chevrons in military work, thereby saving much valuable time.

CHAIR SEATS.—Henry Meyer, Grafton, Wis.—This invention relates to a machine for hollowing the upper surface of wooden chair seats, and consists in the combination of a carriage sliding on prepared rails, with a set screw, by means of which the depth of the depression will be regulated, and with revolving cutters, which can be easily removed from the head to be replaced by others of different shape when desired.

HEAT RADIATING ATTACHMENT FOR STOVES.—James H. Patterson, Glens Falls, N. Y., and Henry B. Northup, Sandy Hill, N. Y.—This inventian relates to a new and improved heat-radiating attachment for Franklin and open stoves, and is a modification of a heat-radiating drum attachment, for which letters patent were granted to these inventors bearing date Jan. 30th, 1866.

DINNER KETTLE.—John Wagner, Cumberland, Md.—This invention relates to a new and improved dinner kettle, and consists in a peculiar construction of the same, whereby a greater number of compartments are obtained than usual, and the different kinds of food kept separate from each other.

CLAMP FOR HOLDING PALM LEAF WARP.—Cyrus Powers, Greenwich Village, Mass.—This invention relates to an improrement in a clamp for holding palm leaf warp to be attached to the apron of the cloth beam of a loom for weaving palm leaf web for hoods or other purposes.

STEEL AND IRON PLATES.—E. T. Ligon, Demopolis, Ala.—This invention relates to the covering of steel with copper, and consists, first, in serrating or otherwise roughening the surface of the steel to be covered, and, second, in then placing the said serrated steel plate, with the copper plate, in contact with such surface, with borax or tinner's flux between the two plates, after which the two plates are placed upon a thick bed-plate of cast iron or steel, previously heated to or above the melting point of copper, which bed-plate is placed on the lower disk of the press, the upper disk of which is made hollow, and with a non-conducting substance inside.

DITCHING MACHINE.—W. A. Nichols, West Liberty, Iowa.—This invention relates to an improvement in a machine for cutting small ditches.

MILK SHELF.—William Veber, Jr., Shingle Creek, N. Y.—This invention relates to a method of constructing shelves for setting milk so as to allow the cream to rise for making butter.

SEWING MACHINE GAGE.—Charles H. Buck, 2d, West Arlington, Vt.—This invention relates to an improvement in a machine for cutting small ditches.

STEAM PLOW.—John C. Delavigne, New Orleans, La.—This invention relates to a method of plowing and cultivating land by steam power,

HOSE FOR CONDUCTING WATER.—Andrew Carney, New York city.—This invention relates to a method of constructing hose for conducting water forced through the same, whereby said hose is rendered more strong and durable and a freer passage is given to water through the same.

PIANO STOOL.—James Bramble and H. M. Deihl, Fort Wayne, Ind.—This invention consists in the application of the principle of hydrostatics for elevating or lowering the seat of a piano stool, whereby the performer may be raised or lowered on the seat without rising from it by the movement of the foot.

SEWING MACHINE.—A. W. Halbert, Taylor, N. Y.—This invention relates to improvements in the construction of sewing machines, and consists in the construction and arrangement of mechanism whereby the working parts are much simplified and movement is given to them all by one wheel directly connected with the needle bar, the shuttle and the feed plate.

CATTLE CAR.—Eugene Fontaine, Fort Wayne, Ind.—This invention relates to an improvement in cattle cars, whereby the same may be adapted for carrying either large or small animals.

COMPOSITION FOR WELDING AND REFINING CAST STEEL AND IRON.—Julius Lehmann, Bloomington, Ill.—This invention relates to a new composition for welding and refining cast steel and iron and for restoring burnt steel.

LOCK.—P. S. Felter, Cincinnatus, N. Y.—The object of this invention is to obtain a lock of simple and comparatively inexpensive construction which will be equally as secure against the efforts of burglars in picking the same as the various expensive burglar-proof locks now made, and one which, when locked from the inner side of the door and the key left in the lock, will not admit of being unlocked from the outer side of the door.

SHAFT BEARING.—Samuel Kine, McVeytown, Pa.—This invention is designed more particularly for the upper bearing of mill stone spindles or shafts but is equally applicable as friction roller bearings for other shafting. It consists of a box inclosing the spindle and which contains friction rollers working in the ends of levers which latter are adjustable by set screws to bring the rollers and spindle in a vertical position. The box serves to contain the lubricating material and is provided with a stuffing box to prevent the oil from running down the shaft.

PLOWS AND OTHER FENCE TOOLS FOR JOINERS' USE.—E. M. Chapin and Solon Rust, Pine Meadow, Conn.—The object of this invention is to construct a joiners' plow and other similar tools which are provided with adjustable fences, in such a manner that the fence guides and screws will not extend through the body or stock of the implement, as is now the case, and which is the source of a great deal of annoyance in using such tools, rendering it necessary for the workman, each time the tool is used, to remove out of the way or to one side tools and implements of various kinds on the work bench which may chance to be at the right-hand side of the tool and near the same.

SAFETY GUARD FOR FIRE-ARMS.—Benjamin P. Cutler, Boston, Mass.—This invention relates to a device for the purpose of rendering fire arms safe from accidental discharge. It consists of a guard rod which is presented at the side of and beyond the cone or nipple to receive the contact of the hammer until the moment of firing arrives when it is then readily withdrawn.

## Answers to Correspondents.

*CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.*

*SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such enquiries, however when paid for as advertisemets at $1 00 a line, under the head of "Business and Personal."*

☞ *All reference to back numbers should be by volume and page.*

J. H., of N. Y., has had the case of his gold watch stained with mercury and asks how to remove the stains. Mercury combines readily with gold and can be effectually removed only by heating. Heat volatilizes the mercury, which leaves in the form of vapor. A careful hand may, by the use of a blow pipe or even a common spirit lamp, remove the stains without injury to the works or case, which may, however, require after polishing.

S. G., of Pa.—"What is the rate of increase of pressure of confined atmospheric air at high temperatures?" The pressure of confined air is increased at the rate of fifteen pounds for each addition of about 500° of sensible temperature. You will find this matter and your cognate questions discussed in "Cook's Chemical Physics."

E. F., of R. I.—"In the common pump is the whole column of water raised at every stroke by the muscular force of the operator?" Yes.

J. H., of Mass.—"The equivalent of acetic acid (dry) is 51· of of oxide of lead 111·7. I should suppose by this that each part of (dry) acid would dissolve 2 parts of oxide of lead. I have only been able to make one part of dry acid dissolve only a little more than one part of oxide of lead without the formation of a basic salt; how can this be prevented?" There should be no difficulty in dissolving 111·5 parts of oxide of lead (by weight) in 51 of acetic acid and obtaining a neutral salt. Have you perhaps tried to dissolve 2 equivalents instead of 2 parts by weight? "After ammonia has been extracted from the ammoniacal liquor of the gas works, can the residue be profitably employed to manufacture cyanides or carbolic acid?" We believe not.

C. G., of Ohio.—"What is the extreme radius of a 52-sided polygon, the sides of which are twelve feet each?" We do not know whether by the "extreme radius" you mean the longest diagonal or the radius of the circumscribed circle. At your request we will give you a simple method of determining such questions yourself without much knowledge of mathematics. Draw a circle and two diameters of it at right angles to each other. Divide every quadrant of the circle into the requisite number of equal parts, in this case *e g* into B arcs, each about 7° in length. By connecting the ends of each arc by straight lines you will construct the polygon. Now draw the line required, and by means of a graduated ruler, compare its length with any of the sides of the polygon. If, for example, in our case the "extreme radius" is N times larger than one side of the polygon, its actual length will be N x 12 feet.

J. H. T., of Racine College.—"Will you inform me of the process of preserving bird's skin, both for laying away and also for setting them up in cases?" Bird's skins are preserved by rubbing them with a solution of arsenic or corrosive sublimate. The first, after a time, evolves arseniated hydrogen, which is highly poisonous.

G. C., of N. Y.—"Can you inform me why a continuous sound issuing from a rapidly moving body (take for example the whistle of a locomotive) is a higher note when approaching than when directly opposite, or past the point where one is standing? The sound slurs as it passes, from the note at which you first hear it, to one several semitones below. The same phenomenon may be observed during the passage of a shot or shell." We have never observed this phenomenon and are inclined to class it among the "auricular" delusions. Perhaps, also. our correspondent confounds the intensity with the pitch of the sound; the former varies with the distance, while the latter remains the same.

J. B. D., of N. Y.—Stone breaking machinery was made by a Mr. Blake, of New Haven, Conn, several years ago, and perhaps is still made by him. We have had a great many inquiries for this class of machinery, and parties who can furnish it would find a demand by advertising.

G. W. N., of Pa.—"What is the difference between the stroke and the throw of a cam? Some contend that the stroke is the hight it raises a lever, and the throw the point at which the steam is cut off." The "throw" of a cam is the distance it moves the lever. If the lever is hung and vibrates on its center, the movement of the valve corresponds with it and is the throw.

## Business and Personal.

*The charge for insertion under this head is one dollar a line.*

There are now in actual operation eight thousand of Ashcroft's Low-Water Detectors. John Ashcroft, 50 John st., New York.

Tube Well—Best in Use.—Patented in 1865. State, County, and Town Rights for sale. Send for circular and prices. Address Dutton & Maguire, Port Jervis, N. Y.

Parties wishing to Manufacture the Holler Knitting Machine on royalty, or who would manufacture machines for a Company, address Todd & Duncan, Bellefonte, Pa.

Henry Carey Baird, Industrial Publisher, 406 Walnut st., Philadelphia, has just issued a new and much enlarged descriptive Catalogue of Practical and Scientific Books, 56 pages, 8vo, now the largest list of this character, comprising only the Publications of any one house in either the United States or Great Britain. It will be sent free of postage to any one who will favor him with his address. Every reader of the Scientific American is invited to send for it.

Coal-oil Works, revolving retorts and refinery, lately erected, for sale. Address, on the premises, John White, Darlington, Beaver Co Pa., or C, G. Waterbury, 116 Wall st., New York.

$2,500 will buy one-half interest in a business that will pay fifteen thousand dollars a year. Address Steam Mill, Belair, Ga.

Bartlett's Reversible Sewing Machines are the cheapest reliable Machines. Bartlett Machine and Needle Depot 569 Broadway, N. Y

Mill-stone Dressing and Glaziers' Diamonds. Also, for all Mechanical purposes. Send stamp for circular. John Dickinson, 64 Nassau st., New York.

For Patent Engine Lathes and Upright Drills, Planer Centers, Lathe Chucks, Planer Chucks, and all kinds of Cutlery Machinery address Thomas Iron Works, Worcester, Mass.

Incrustations of Boilers removed and prevented by Winans' Boiler Powder. (11 Wall st., N. Y.), 12 years in use, no injury, no foaming.

To insure the safety of your steam boilers, property, and life, apply Ashcroft's Low-water detector. John Ashcroft, 50 John st., N. Y.

For Improved Lathe Dogs and Machinists' Clamps, address for Circular, C. W. Le Count, South Norwalk, Conn.

Brick Machine.—Lafler's New Iron Clad has more advantages than any other ever invented. For descriptive circular address J. A. Lafler & Co., Albion, Orleans county, N. Y.

For Cotton and Woolen Machinery—Roll-carding Machines, Ring and Traveller Spinning Frames, etc., address Union Iron Works, Rhinebeck, N. Y.

Seal-Press Manufacturers will find the most valuable invention of the age, in their line of business, advertised on another page.

Malleable-Iron Manufacturers, for small articles, please send address to N. W. Robinson, Moriah, Essex Co., N. Y.

Henry Carey Baird, Industrial Publisher, 406 Walnut street, Philadelphia, Pa., has just published "Perpetual Motion;" or, A Search for Self-Motive Power During the 17th, 18th, and 19th Centuries. By Henry Dircks, C. E., with numerous Illustrations. 558 pages. Price $3 50 by mail free of postage.

Parties wishing to contract for first-class Brass and Composition Castings, please address Ridlon & Bond, P.O. Box 733, Biddeford, Me.

Projecters of Wooden Railroads address G. S. Nevius, Bushnell, Ill.

Manufacturers of Wrought Butts and Flap and Strap Hinges address X. Y. Z., Lock Box No. 236 Providence, R. I.

Wanted—A Situation in a Planing Mill, as Foreman, or to take charge of Machinery and Saws. Address W. F. Gordon. Ann Arbor, Mich. Good reference given if required.

A No. 5 P. H. & F. M. Root's Blower for a large foundery, but little used, for sale by Hale, Murdock & Peters Columbus, Miss.

Allen's Catalogue of Agricultural and Household Implements and Machinery, Seeds and Fertilizers.—Messrs. R. H. Allen & Co. 189 and 191 Water street, New York (P. O. Box 376), have just issued a new edition of their very complete and handsome Catalogue for the current and coming season. It fills 272 pages, illustrated with nearly 600 engravings, and is sent to applicants for $1—less than the actual cost of production.

## NEW PUBLICATIONS.

POEMS. By Mrs. O. M. Livingston. New York: Hurd & Houghton.

A volume of poetry, homely, unpretentious, and fresh; the subjects, mostly drawn from New England home scenes, treated without any attempt at "fine writing," and charming for their naturalness and simplicity. The text is clear and elegant, justifying the well-earned reputation of the publishers.

THE WATCH. How to Choose It and How to Use It. By H. F. Piaget, 119 Fulton street, N. Y.

This is a very small work, comprising less than 100 pages, but the author is a practical watchmaker, and the hints he gives to purchasers and owners of watches are very useful. He gives a brief description of the difference in the construction of watches made by the various celebrated manufacturers in Europe and in our own country, which is of importance to the uninitiated purchaser.

KNOX COUNTY, ILL., DIRECTORY.

J. L. Dewey, Galesburg, Ill., has undertaken the publication of Directories for the different counties in Illinois. The first of the series (Knox county) is just out, and will be found of interest to every resident of that county.

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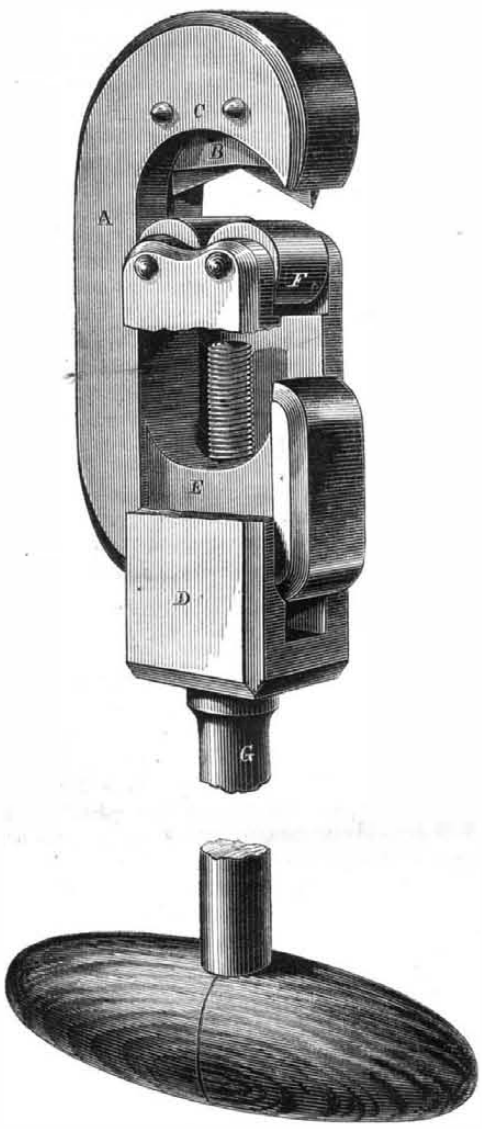
## GETTY'S PATENT PIPE CUTTER.

Hand pipe cutters have not been always successful ventures. Most of them have some radical defect, in some the cutter frequently breaking, while in others the head block forms a bearing for the pipe, creating great friction, making the labor of cutting excessive, and wearing the head block rapidly away. Others have no proper method of securing the carrier or slide, which sometimes gets lost, and the tool is useless. In those which depend on some kind of scraper to take off the burr edge left by the action of the knife, the friction and labor are also great. The inventor of the cutter shown in the engraving believes these objections are removed in this implement.

The head block, A, is forged of wrought iron, and is slotted for the reception of the knife, B, which is V-shaped, and thus makes a drawing cut, no matter how it is turned, and while making a splendid cutting tool, it also serves the double purpose of a rest for the pipe while being cut and a protection to




the head block. The pins, C, which are tapering, pass through the head block and knife, and thus, though holding the latter perfectly firm, allow it to be easily removed. The slide, D, is of malleable iron, and travels in a broad groove, E, formed on the sides of the head block. It carries the two steel anti-friction and pressing rollers, F, which allow the cutter to work smoothly and easily, and also rolls down the burr edge thrown up by action of the knife, and presses the pipe to be cut up against the knife. The handle, G, has a boss formed on it for the purpose of pushing the slide, which carries the anti-friction rollers, forward. One end of it is screwed, and works in a thread formed in the head block. The other end has a wooden handle for the purpose of working the implement.

The advantages of this cutter are as follows: The knives are simple, durable, easily replaced, and they are interchangeable; the rollers roll down the burr edge, and make the cutter work easily; the slide is always held perfectly steady, no matter how small the pipe being cut, by means of the grooves in the head block, and also by the handle rod; the head block and slide cannot wear out, as the former is protected by the knife and the latter by the rollers. There are two sizes; one cuts from one inch down, the other from two inches to three quarters of an inch.

Patented through the Scientific American Patent Agency, Aug. 6, 1867, by Henry Getty, of Brooklyn, N. Y., and they are manufactured by McNab & Harlan, 86 John street, New York city.

### Curiosities of Sound.

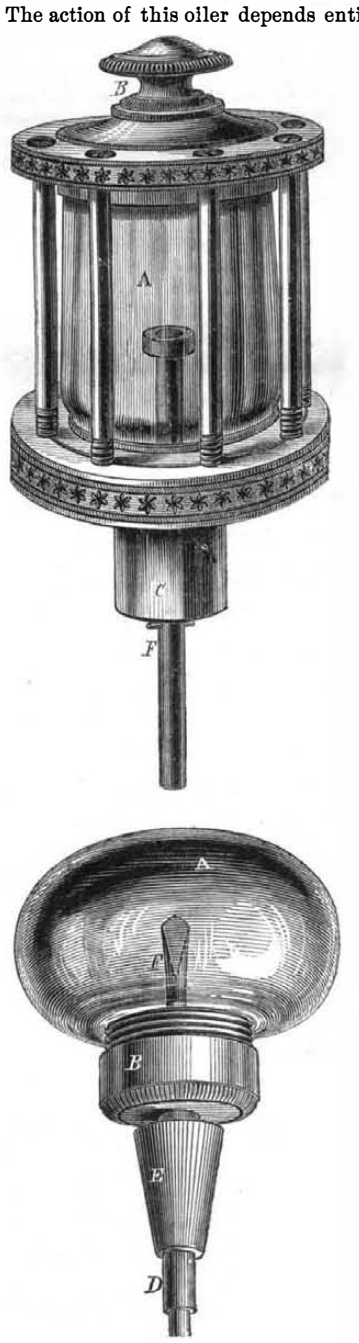
Among the things not generally known, Dr. Tyndall informs us that sound resembles light, in being susceptible of refraction. The refraction of a luminous beam by a lens is a consequence of the retardation suffered by the light in passing through the glass. Sound may be similarly refracted by causing it to pass through a lens which retards its motion. Such a lens is formed when we fill a thin balloon with some gas heavier than air. As an example, the professor takes a collodion balloon filled with carbonic acid gas, the envelope being so thin as to yield readily to the pulses which strike against it, transmitting them to the gas inside. He then hangs up his watch close to the lens, and then, at a distance, of four or five feet on the other side of the lens, he listens, assisting his ear with a glass funnel, which acts as an ear trumpet. By moving his head about he soon discovers a position in which the ticking of the watch is particularly loud. This, in fact, is the focus of the lens. If he moves his ear away from this focus, the intensity of the sound decreases. If, when his ear is at the focus, the balloon be removed, the ticks are enfeebled; on replacing the balloon their force is restored. The lens enables him to hear the ticks distinctly when they are perfectly inaudible to the unaided ear. The sound lens magnifies small sounds, as the glass lens magnifies minute objects. Thin india-rubber ballons form excellent sound lens.

The moderate speed of sound in air is the cause of a number of curious facts which ignorant people might take for contradictions. For instance, if a row of soldiers form a circle and discharge their pieces all at the same time, the sound will be heard as a single discharge by a person occupying the center of the circle. But if the men form a straight row, and if the observer stand at one end of the row, the simultaneous discharge of the men's pieces will be prolonged to a kind of roar. A company of soldiers marching to music along a road, cannot march to time together, for the notes do not reach those in front and those behind simultaneously.

The velocity of sound in water is more than four times its velocity in air. The velocity of sound in iron is seventeen times its velocity in air. The difference of velocity in iron and in air may be illustrated by the following instructive experiment: Choose a long bar of iron, and let an assistant strike the bar at one end, while the ear of the observer is held close to the bar at a considerable distance. Two sounds will reach the ear in succession; the first being transmitted through the iron, and the second through the air. This effect was observed by M. Biot, in his experiments on the iron water pipes of Paris.

## IMPROVED OILER FOR SHAFT JOURNALS, CRANK PINS, ETC.

The action of this oiler depends entirely on the motion of the journal to which it is attached, it giving out no oil when the shaft is still, but adapting the amount delivered to the velocity of the surface of the journal. It is made in different forms for adaptation to different positions. The oil receptacle, A, is of glass, either incased in an ornamental frame of brass, or supported by a brass cap and stem. The caps, B, are for filling the oil cups, and when screwed in, or on, are air tight. The stem, C, may be plain or threaded, as desired, for securing the cup to the cap of the box, or the strap of a connection, crank, etc. The stem or pipe, D, receives on its exterior a wooden cone, E, for the same purpose of attaching it to the box. Through the hollow stems, C and D, passes a wire, F, which may be called a feeder, the lower end of the wire resting on the journal of the shaft and receiving a trembling or jarring motion from the rotation of the shaft. This motion allows a sufficient quantity of atmospheric air to pass up through the annular space between the pin or wire, F, and the interior of the stem, C or D, to assist in the downward movement of the oil, while the motion itself aids to the same result. Patented through the Scientific American Patent Agency, May 2, 1867, by I. R. Dreyfus, whom address, at 35 John st., New York, or P. O. box 5476.




### Artificial Ivory.

I make use of the following ingredients, in about the proportions named, by weight: Shellac 8 parts, asbestos 7 parts, kaolin 2½ parts, camphor ½ part. To these I add the desired coloring matter. For light colors, sufficient white lead or similar pigment (about two ounces), to make the compound a white ivory color, and this may be tinted almost any desired hue, but for dark colors a less proportion of white may be employed, or it may be omitted.

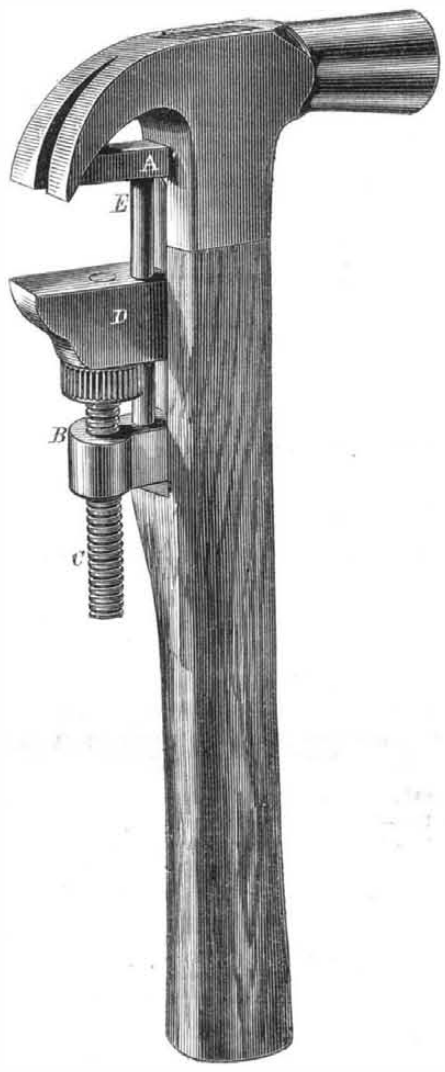
My compound is designed to imitate ivory, and is adapted to the manufacture of any article that can be formed by pressure while in a heated, plastic state; for instance, billiard balls, numbers, counters, checks, paper cutters, ornamental fancy articles, and, in dentistry, may be used for the filling of teeth, for artificial-gum work, and for plates, as the said composition may be colored of almost any hue.

The composition I employ is to be heated and mixed in the most thorough manner. For this purpose I mix my ingredients after they have been finely ground or pulverized, and I prefer to employ a pan heated by steam at a temperature of about 240° to 280° Fah., and then thoroughly mix or grind the substances together between heated rollers.

Recently patented by Alfred Starr, of New York city. We think it will be some time before dentists make use of this compound for filling teeth. It bears about as close a resemblance to ivory as chalk does to cheese.

## MEEKER'S COMBINED CLAW HAMMER AND SCREW WRENCH.

The engraving is a view of a combined tool, which is intended mainly for the use of farmers, teamsters, and others, who have not ready access to shops or a chest of tools, and is




adapted to the facilitation of repairs in exigencies. It is a simple and handy tool, notwithstanding its double office. It is really a common claw hammer, one of the claws of which has a connection reaching from the point of the claw to the shank of the hammer, and forming, as at A, the stationary jaw of the wrench. A plate is inserted into the handle, having at the handle end a projection, B, which is a nut for the screw, C, that moves the jaw, D, by means of a knurled knob as in ordinary screw wrenches, a rod, E, being the guide for the movable jaw. It will thus be seen that the screw wrench is complete in itself, and yet is an efficient claw hammer. If, however, the hammer alone should be needed, a screw, the head of which is on the side opposite the jaws, may be loosened, and the wrench plate with its appurtenances removed, leaving simply an ordinary hammer. For farmers, wagoners, and others, it will prove a valuable tool.

Patented through the Scientific American Patent Agency, Feb. 18, 1868, by Ellis R. Meeker, who manufactures largely at Elizabeth, N. J. This combination tool can be sold at a price very little in advance of the ordinary claw hammer. For further particulars address the patentee and manufacturer, as above.

### An Invention Wanted.

A correspondent calls our attention to the importance of the peanut crop, which, he says, in Eastern Virginia and North Carolina, is being very much extended; the greatest difficulty attending the preparation of the crop for market is the picking from the vines, which is done by hand, a tedious and expensive operation. No machine having been yet introduced for that purpose, will you please call the attention of inventors, through the medium of your widely circulating journal, to the great need of such a machine.

While force of some kind must be employed to create or construct a reservoir of power, and that force is greater, reckoning friction, than the power ultimately yielded; yet if it can be exerted with a comparatively brief expenditure of time, it may be an economical means of creating power to be used gradually or at intervals.

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NEW YORK, SATURDAY, APRIL 18, 1868.


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## THE VALUE OF SKILLED LABOR.

It is unpleasant to read in our daily journals of the destitution among our laboring classes because of the lack of work. Yet it is the fact that thousands are actually suffering for want of employment, and still it is no less the fact that skilled labor is in as great demand now as ever. The thorough master of his business, unless that business is entirely prostrated, will never find himself, for any long time, unemployed, if he desires employment. If a workman at any business—mechanical or intellectual—is not a competent worker the place he desires will be sure to be filled by his superior, the master of his business. Men, like the particles of fluids, must find their level, and neither can rise above it without outside aid. The man in any business whose sole use and value is to fill a hole accidentally left open, does not amount to much. He only is valuable whose services are eagerly sought, and, being secured, are retained. When the employer seeks the worker it may be considered that the latter is worth the seeking; but there are thousands who might be sought, but who never would take the trouble to make themselves worth the seeking. These "slumps" of mechanics, making pretense to a name to which they have no right, are stumbling blocks in the way of really worthy men. We speak not of the apprentice and learner who have never had a sufficient opportunity to acquire a full knowledge of their business, but of those who, being either unfitted by taste or talent for their chosen business, look upon it solely as a means of earning their bread and butter and never imagined such a thing as enthusiasm or interest in their work. Such men, even in the best of times, are suffered and borne with, rather than valued in the shop. They may do the work set before them, but never care enough about its character when finished or their own reputation as workmen to take care and pains, use thought and brains, as well as muscle, in its prosecution. Being only automatons—breathing machines—their places are filled by work-*men* as soon as business becomes slack.

Yet it is not difficult for the worker to arrive at the head of his profession, whatever it may be, if first he has any aptitude and taste for it. All that is needed is application and an interest in his work. It may take years to accomplish the result, but the time will have been profitably spent. Once a workman, in the highest sense of the term, his future is secure. His efforts will be appreciated and his proper position assured on a very brief trial, even by a stranger.

These remarks apply equally well to those who live by their brain rather than their muscle; many a so-called editor is such simply by the circumstance that no proper man has found and occupied the position assumed by him who cannot properly fill it. And possibly there is no more bare-faced assumption of responsibilities and duties for which the pretender is totally unfitted than that of some would-be literary people; yet the mechanical branches of industry are thronged with such apologies for workmen; men who have no love for their work, no respect for themselves, and no regard for the interests of their employers. Such men should turn their attention to work requiring scarcely more brains than that of the ox.

The skilled workman is to be envied. He knows his own value, and feels thereby a pride in his business and a respect for himself. He is, in a measure, independent, for his services are needed and will always receive their full market value. It is better to be a thorough workman in the lowest branch of mechanical business than a mere hanger on in a popular or genteel occupation. Will our young men and mechanics consider this matter?

## SHAFTING AND BELTS---ABSORPTION AND TRANSMISSION OF POWER.

The renting of power for driving machinery is in many parts of the country as common as the renting of habitations and places of business, but while the value of the yearly amount to be paid for the latter can be easily ascertained and fixed, from the known cost of the premises, this or other sufficient data are wanting in regard to the amount of power used. Where that power is ample and cheap, as in a constant and sufficient water privilege, the amount of rent paid may be of little consequence; but where all the power must be generated from fuel and transmitted by the steam engine, it becomes a matter of great consequence to the proprieter. Only the crudest means are at present available to ascertain the amount of power transmitted by pulleys and belts. So many conditions are to be considered that the construction of a set of rules for calculating the amount of power in all cases, is simply impossible. Not only the width of the belt, the diameter of the pulleys, and the relative position of the shafts, but the condition of the belts and the velocity of the shafts, must be taken into consideration, together with the peculiar circumstances which every separate case presents.

It is well known that the closest mathematical calculations, based on the style of engine, diameter of cylinder, length of stroke, velocity of piston, pressure of steam, and other points of a steam engine fail to give accurately the amount of power the machine may develope. The actual trial by means of the indicator in the hands of a skillful manipulator is the only reliable test. From one of the best—if not the best—masters of the indicator in this country, we learn that engines calculated by their builders to give a certain amount of power often so signally fail of achieving the result desired that in one recent instance an engine calculated for sixty-horse power had run for months yielding less than twenty-six-horse power! The indicator showed the fact, and the experience of the operator detected the fault and pointed out the remedy.

Now if in a machine constructed with such care and skill as the steam engine such a wide difference should be found between the calculated and indicated horse power, what difference should we not expect, when the test is applied to a case presenting so many points of possible variations between the intended and real amount of power as that of belt transmission? And it is the fact that in very many cases the proprietor of steam power, knowing the actual power of his engine, finds that letting for hire what he deems is one-half of that power, his tenants are absorbing nearly the whole available power. The rough method of calculating the amount of power delivered or transmitted, by the width of driven belt—a plan which was common enough a few years ago, and may be so now—is as ridiculous and as far from the truth as the formula of the astronomical instructor who taught his pupils in estimating the distance of the fixed stars from our planet to "guess at the distance and multiply by four;" or as accurate as the man who took the measure of a door opening in a house he was building by measuring it with his outstretched hands, and rushed to the door maker with his hands held in position. Scarcely less nonsensical and foolish is the plan of charging for power to drive a wood turning establishment, with its lathes revolving at the rate of thousands of revolutions per miuute, at the same price per machine as the machine shop with its equal number of lathes and planers revolving at a very low rate of speed. Yet we have seen, very lately too, a case of this character, where the owner of an establishment actually rented power for a wood worker—sawyer and turner—at a lower price per machine than he charged a machinist, and then wondered how the power of his engine could be so absorbed. "Wood, he said was easily worked; it must require more power to drive a lathe turning iron than one turning wood." In this statement he plainly showed his want of knowledge of the simplest principles of mechanics. Velocity is a great absorbent of power, and where a shaft is run at a rapid rate the very friction of the shaft is a serious drawback to the amount of power it will transmit compared with the amount received. To get the best results from belts they should not be driven more than thirty feet per second or eighteen hundred feet per minute; yet they are often driven at a much higher rate. There is a limit to the effective cohesion of belts to pulley faces, a fact, we are sorry to notice, some of our best mechanics are slow to acknowledge, or, at least, to put in practice.

A belt running horizontally—not crossed—will without excessive tension, deliver more power than one of the same width and weight running vertically. This every mechanic knows. It will also run easier. So with belts in other positions and under varying circumstances. It is evident, therefore, that calculations of the power transmitted by belts, based exclusively on their width, will not be reliable under all circumstances.

From a letter before us we learn that by the trial of a dynamometer, already patented and now in process of repeated and extended trial, the results of its trial have surprised letters of power and disgusted the hirers and users. In a trial where it was tested by the most elaborate and exact experiments, in one case it was found that it showed a difference of one hundred and twenty-five per cent between the amount of power used and that actually paid for, in favor of the proprietor. "Few," he says, after many trials, "imagine the amount of power absorbed by rapidly-driven shafts." We hope his endeavors to construct a dynamometer, which may be applied under all circumstances, and give reliable results, may be successful. It is much needed.

## USELESS SPECULATIONS.

There is a strange quality in the human mind, by virtue of which it ever seeks to divine the unfathomable and to unravel insoluble mysteries, neglecting often the more useful and practical inquiries of every day life in order to gratify its *penchant* for metaphysical subtleties. Every age has been haunted by some scientific phantom-problem, which it was beyond the power of human mind to solve, and the period of time in which we live forms no exception to this rule. While formerly the discovery of the "philosopher's stone," and other impossibilities, engaged the attention of actual and pretended philosophers, speculations concerning the origin of the world have of late years become the favorite theme of theorists. But there is one fact to which we will call attention. The labors of the alchymist laid the foundations of modern chemistry; the search for the square of the circle promoted mathematical science, and to the failure in securing perpetual motion we owe the spread of clearer notions on the subject of mechanical principles; but what, we ask, is the benefit that shall accrue to mankind from the vain attempt to lift the veil from the mysteries of the first creation? Even if any one of the thousand theories proposed would commend itself to general approval, it would only be a barren acquisition to our theoretical knowledge, from which not a single useful result could be expected, and which would prove to be valueless in the advancement of our race.

We make these remarks because an examination of the correspondence sent to this office discloses the fact that many of our readers waste their time and abilities on this unprofitable subject. We have also occasion to notice the entire disregard or ignorance of the most elementary and best established principles of science on the part of these theorists. Wild notions of heat, electricity, the properties of matter, and so forth, form the cement which holds together the hypotheses and speculations with which they construct the unsubstantial fabrics of their brains. They are not aware that our knowledge of the behavior of matter under the influence of extremé temperatures (heat or cold), is, as yet, far too imperfect to warrant attempts of generalization. The creation of matter, its formation and gradual settling into the present arrangement is a fit subject for the reveries of the poet or the unbridled speculations of the metaphysician; but practical men who are willing to improve themselves and others should leave it alone. There are too many urgent questions of real importance which claim and deserve all the attention and energy which they can bestow upon them. Those of our friends, however, for whom the temptation to "lift the veil" should prove too strong, will pardon us for suggesting that their first duty is to obtain a comprehensive knowledge of physics and chemistry. If, after obtaining this, they find that they are further from the solution of the puzzle than they thought themselves before, they will at least not have to repine for wasted time and labor, as they can render their newly acquired knowledge useful in a thousand different ways.

## TECHNICAL EDUCATION.

In the matter of "technical education," which now forms a prominent topic of discussion on both sides of the Atlantic, there has been, hitherto, altogether too much talking and too little that looks toward a practical, satisfactory, and speedy solution of the question, and yet the discussions are becoming still more long-winded and unintelligible every day. If we are willing to look on and wait till the philosophers have ceased to wrangle on this subject and have come to an agreement among themselves, the day of judgment will certainly dawn on an earth unprovided with technical institutions. The necessity for something of this sort is, we think, all but universally recognized; the rest is of minor importance. If the institutions are once established the settlement of subordinate points will be best accomplished when they present themselves in practice. We therefore call upon those interested to move in this matter. A good beginniug for the present would be the appointment of a teacher of natural sciences in every public school. There is plenty of time to spare for instruction of this kind there, and it would be a pleasant addition to the established scheme of studies. We have no doubt that the Board of Education and the various committees of trustees to whom the duty of watching over the interests of instruction is committed, would give their consent to this plan if they are approached in the right manner. This point gained, it would become a mere question of time to mature a more systematic and complete plan, which would fully meet our necessities. Workingmen, mechanics, artisans, laborers of every kind, recollect that your interests are chiefly at stake; for your sake the agitation was confessedly begun, and you should, therefore, lend a helping hand in the attainment of its objects. If your organizations bestir themselves vigorously there is no doubt, with a community constituted like ours, that you will soon be gratified by the fulfillment of your wishes.

## REPORT ON LIFE-SAVING INVENTIONS.

The official report of Capt. W. M. Mew to the Secretary of the Treasury, detailing the results of the investigations of the government commission which met in New York city in April last, is before us. From it we learn that about three hundred and seventy inventions, designed for saving life at sea, were entered for examination, of which a number were not reported upon, they either not coming within the scope of the objects of the commission, or lacking in merit. A large number, however, were tested with great care and are recommended in the report for adoption and use. Capt. Mew says that in addition to the trials before the commission the inventions have been subjected to practical tests through

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successive months of service, with a design to ascertain the correctness of the commission's first favorable report, and this has been the reason of the delay in its publication.

We believe the labors and report of the commission will exercise a very favorable influence on our inventors and mechanics. It is a step in the right direction, and it is to be hoped that this will not be the last of these official competitive examinations. Much credit is due Capt. Mew and the gentlemen associated with him for the very thorough manner in which their duties were performed. Over six weeks were spent in the examination of the inventions brought before them, and we believe that while the investigations were thorough and exhaustive no inventor had cause to complain of injustice or unfairness.

## PAINTING AND PRESERVING IRON WORK.

A good black paint for coarse iron work may be made by mixing plumbago with hot coal tar. Equal parts of asphaltum and resin dissolved in common turpentine make also a good, cheap covering for heavy iron work. For machinery, dissolve 2 pounds india rubber, 4 pounds resin, and 2 pounds sheilac, in 5 gallons of benzine. This may be used with any other paint as a vehicle. Wrought iron bridges are painted with white lead as follows: The iron work is first made clean by scrubbing and brushing it with wire brushes; this done, all the cavities and fissures are filled up with a putty of litharge, linseed oil, varnish, and white lead; this filling being dry, brushing is repeated. Afterward, a paint is applied, consisting of 300 pounds of white lead, 10 gallons crude, 1 or 2 gallons boiled linseed oil, and 1½ gallons of turpentine. This paint is repeated when sufficiently dry, and finally evenly overspread with white sand. Galvanizing is employed also to prevent rusting. I have found a galvanizing paint in the trade, consisting chiefly of zinc powder and oil varnish. Rusting is further prevented by rubbing the red hot iron with wax, tallow, pitch, or coal tar. Rubbing with heavy petroleum is also well adapted for keeping iron work clean. The common varnish is obtained by adding at 280° some dried sulphate of zinc to boiled linseed oil—take one ounce for one gallon; a better kind is made by boiling 7 gallons of the former with 3 pounds of litharge and 2½ pounds of wax, until thick; when sufficiently cool and settled, the liquor is poured from the remainder.

Copal varnish is prepared by mixing 7 pounds of fused copal with ⅔ gallons of hot drying oil, thinning it off with 4 gallons of turpentine, and straining through a wire sieve of proper fineness. Amber varnish: Fuse 6 pounds of amber in an iron pot, and pour in 2½ gallons of hot clarified oil; boil it until it can be drawn out into a stringy mass, and mix with it 5⅓ gallons of turpentine. Black iron work varnish: Put 48 pounds of asphaltum in an iron kettle, and boil it for four hours. During the first two hours, introduce 7 pounds of red lead, 7 pounds of litharge, 3 pounds of sulphate of zinc, and 12 gallons of boiled oil. Continue the boiling for two hours, and when cool thin it off with 40 gallons of turpentine. Another recipe: Add gradually to 7 gallons of crude oil at a gentle heat, 10 pounds asphaltum in three gallons of hot oil; by stirring continually, add 7 pounds of litharge, 7 pounds of red lead, 3 of sulphate of zinc, and boil for three hours; let cool, and thin off with 40 gallons of turpentine, and strain finally through a fine sieve.

## Yankee Ingenuity--A Reliable Improvised Alarm.

We believe our readers will be as much interested and amused as were we on the perusal of the following from a "Down East" (Bath, Me.) correspondent:

"I once stopped overnight at the house of a friend. It was desirable that we should take an early train next morning, and notwithstanding the assurance of the servant that we should be called bright and early, I felt anxious on retiring lest we should not rise in time; I therefore beset myself to devising an alarm. The only "base of preparation" was my watch. This I opened the face of, exposing the hands, and laid it, back down, on the toilet table. The hour-hand only was available to produce the action that should give the alarm, the minute-hand having many revolutions to make ere the appointed hour. A blade at each end of my pocket-knife was opened and the handle supported on three pennies (piled one on top of the other) so that it should be balanced, and at the same time have the blades on a line with the face, one blade resting lightly on the figure 4—the minute-hand passing over it in its revolutions. The object of this arrangement was to cause the hour-hand, on arriving at the hour of 4, to come in contact with the blade, and the knife being balanced, the hand would have sufficient power to move on its pivot (the pennies), the opposite end of the knife, of course, having a reverse motion.

I next drove a pin into the end of the handle of our hairbrush, and balanced it on the edge of the table, just so that it would topple over were not the end with the pin in it held down gently by the head of the pin coming under the blade at the end of the knife opposite the watch. I had previously tied one end of my handkerchief to the handle of the brush; the other end I now secured to the comb, with which I propped up the heavy lid of a fancy box that set on the table, leaving some "slack" between the brush and comb.

The machine was now "set," and the expected operation was this: The hour-hand should push the blade resting on the figure 4; the other blade would have a corresponding motion and slip off the head of the pin in the brush handle; this would allow the brush, balanced on the edge of the table, to tilt and fall, the slack in the handkerchief allowing it to acquire sufficient momentum in falling to pull out the comb supporting the heavy lid of the fancy box, which should fall "with a loud noise." These things really came to pass at the appointed hour, and we were roused from our slumber in time for the early train, and went on our way rejoicing."

## Hall's Combined Pocket Knife and Door Button.

We would call the reader's attention to an engraving of a pocket knife illustrated of the back page of this paper. The invention consists in converting the ordinary pocket knife into a portable door button, always on hand and ever ready for an emergency, without additional cost or inconvenience.

The screw, as will be seen by the engraving, is hinged or pivoted in the back of the knife, and can be shut down the same as a blade. It is comparatively burglar proof, as it can be screwed fast to the jamb of a door at any point unknown to the burglar, and its use for a single night, where a person is in a room without a secure fastening to the door, would more than pay for its cost in sound sleep, especially if money or valuables were exposed. We have no doubt from its simplicity and utility, that it will become the favorite pocket knife with the trade. Merchants would do well to call and see it or send for a sample.

Dr. A. W. Hall, of 208 Broadway, New York, is the inventor and sole manufacturer.

## AMENDED TAX BILL.

The annexed new Tax Bill has passed both Houses of Congress and received the President's signature. The law went into effect on the 1st of April, and will be a great relief to our extensive mechanical interests, while the penalties for fraudulent returns from whisky manufacturers are so stringent that it is believed the frauds heretofore perpetrated by unprincipled distillers will be effectually prevented.

*Be it enacted, etc.*, That sections 94 and 95 of the act entitled "An act to provide Internal Revenue, to support the Government, to pay interest on the Public Debt, and for other purposes," approved June 13, 1864, and all acts and parts of acts amendatory of said sections, be and the same are hereby repealed, except only so much of the said sections and amendments thereto as relates to the taxes imposed thereby on gas made of coal, wholly or in part, or of any other material or illuminating, lubricating, or other mineral oils or articles the products of the distillation, redistillation, or rennning of crude petroleum, or of any single distillation of coal, shale, peat, asphaltum, or other bituminous substances; on wines, therein described, and on snuff and all other manufactures of tobacco, including cigarettes, cigars, and cheroots, provided that the products of petroleum and bituminous substances hereinbefore mentioned, except illuminating gas, shall from and after the passage of this act, be taxed at one half the rates fixed by the said section 94.

Sec. 2. That nothing in this bill contained shall be construed to repeal of interfere with any law, regulation, or provision for the assessment or collection of any tax which under existing laws may accrue before the 1st day of April, A. D. 1868; and nothing herein contained shall be construed as a repeal of any tax upon machinery or other articles which have been or may be delivered on contracts made with the United States prior to the passage of this act.

Sec. 3. That after the first day of June next no drawback of internal taxes paid on manufactures shall be allowed on the exportation of any article of domestic manufacture on which there is no internal tax at the time of exportation; nor shall such drawback be allowed in any case unless it shall be proved by sworn evidence in writing, to the satisfaction of the Commissioner of Internal Revenue, that the tax had been paid, and that such articles of manufacture were prior to the 1st day of April, 1868, actually purchased or actually manufactured and contracted for, to be delivered for such exportation; and no claim for such drawback, or for any drawback of internal tax on exportations made prior to the passage of this Act, shall be paid unless presented to the Commissioner of Internal Revenue before the 1st day of October, 1868.

Sec. 4. That every person, firm, or corporation, who shall manufacture by hand or machinery, any goods, wares, or merchandise (breadstuffs and unmanufactured lumber excepted), not otherwise specially taxed as such, or who shall be engaged in the manufacture or preparation for sale of any article or compounds not otherwise specially taxed, or shall put up for sale in packages, with his own name or trade mark thereon, any articles or compounds not otherwise specially taxed, and whose annual sales exceed $5,000, shall pay, for every additional $1,000 in excess of $5,000, $2; and the amount of sales in excess of the rate of $5,000 per annum, shall be returned quarter-annually to the Assistant Assessor, and the tax on the excess of $5,000 shall be assessed by the Assessor, and paid quarter-yearly, in the months of January, April, July, and October of each year, as other taxes are assessed and paid; and the first assessment herein provided for shall be made in the month of July, 1868, for the three months then next preceding.

Sec. 5. That every person engaged in carrying on the business of a distiller who shall defraud, or attempt to defraud, the United Srtes of the tax on the spirits distilled by him, or any part thereof, shall forfeit the distillery and distilling apparatuses used by him, and all distilled spirits, and all raw materials for the production of distilled spirits found in the distillery, and on the distillery premises; and shall, on conviction, be fined not less than $500 nor more than $5,000, and be imprisoned not less than six months nor more than three years.

Sec. 6. That if any officer or agent appointed and acting under the authority of any revenue law of the United States, shall be guilty of gross neglect in the discharge of any of the duties of his office, or shall conspire or collude with any other person to defraud the United States, or shall make opportunity for any persons to defraud the United States, or shall do, or omit to do any act with intent to enable any person to defraud the United States, or shall make or sign any false certificate or return in any case where he is by law or regulation required to make a certificate or return, or having knowledge or information of the violation of any revenue law, by any person, or of fraud committed by any person against the United States under any revenue law of the United States, shall fail to report in writing such knowledge or information to his next superior officer, and to the Commissioner of Internal Revenue, he shall, on conviction, be fined not less than $1,000 nor more than $5,000, and shall be imprisoned not less than six months nor more than three years.

Sec. 7, *And be it further enacted*, That no compromise, discontinuance, or *nolle prosequi*, of any prosecution under this act, shall be allowed, without the permission in writing of the Secretary of the Treasury and the Attorney General.

Vitrified Caoutchouc.—Photographers will be interested in the invention of M. Marion described in the columns of the *Moniteur de la Photographie*. The new product appears to occupy a position midway between glass and paper, less fragile than the one and less opaque than the other. The use to which this transparent film of india-rubber is destined by its inventor is to receive the film of collodion bearing the photographic image. A glass negative is obtained in the usual manner, and upon the sensitized side of the plate the caoutchouc film is applied by means of a special kind of varnish. When it has become dried, the whole is plunged into a vessel of water and in a few moments the collodion with its image leaves the glass, adhering to the new medium, which latter may be now packed away until it is required to be used to print from.

Improvement in Stem-winding Watches.—Messrs. O. P. Rice, Agent, and J. H. Gerry, Superintendent of the New York Watch Company, at Springfield, Mass., have invented a neat and effective device for winding and setting watches through the stem. It consists of an arbor running through the stem, and having a cam thereon, and a small loose segment riding in a correspondingly curved groove. The arbor being turned in the right direction, by the milled head upon its outer end, the watch is wound, and by slightly withdrawing the arbor, the winding gear is disengaged, when the watch may be set. The device is easily constructed, compact, and is free from the complication usually involved in stem winding devices.

Water-turned journals give a better surface for the action of a lubricant than emery-polished surfaces.

# OFFICIAL REPORT OF PATENTS AND CLAIMS

## Issued by the United States Patent Office,

FOR THE WEEK ENDING MARCH 31, 1868.

*Reported Officially for the Scientific American.*

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

| | |
|---|---|
| On filing each Caveat | $10 |
| On filing each application for a Patent, except for a design | $15 |
| On issuing each original Patent | $20 |
| On appeal to Commissioner of Patents | $20 |
| On application for Reissue | $30 |
| On application for Extension of Patent | $50 |
| On granting the Extension | $50 |
| On filing a Disclaimer | $10 |
| On filing application for Design (three and a half years) | $10 |
| On filing application for Design (seven years) | $15 |
| On filing application for Design (fourteen years) | $30 |

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ *Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.*

76,033.—Carriage Wheel.—Levi Adams, Amherst, Mass.

1 claim, 1st, The metallic, cone-shaped shield or deflector, C, applied or attached to the hub and spokes of the wheel concentric with the hub, substantially in the manner as and for the purpose set forth.

2d, The combination of the metallic nub, A, with the box, D, arranged substantially as shown and described.

76,034.—Hinge.—John Adt, Wolcottville, Conn., assignor by mense assignments to Wm. H. Hart and George S. Hurford.

I claim a hinge pin formed with a head at each end, previous to being introduced into the hinge, in the manner set forth.

76,035.—Tool for Shearing Bolts.—Abram Alexander (assignor to Alexander Bolt Manufacturing Co.), Pittsburg, Pa.

I claim, 1st. In tools for cutting round iron bars, the combination of the crank, D, pitman, E, lever, F, cogs H H, with the pieces, K K', dies, M and M', and suitable frame, A A' A' B, arranged substantially in the manner and operating as set forth.

2d, The sliding pieces, K and K, carrying sharp-edged steel dies, constructed as described, for indenting or grooving round iron rods for cutting the same, all arranged and operating substantially as specified.

3d, The dies, M and M', having sharp ridges, m m', and the projection, V, when used for grooving and breaking round iron, in the manner substantially as described.

76,036.—Harness Operating Mechanism for Loom.—John Bachelder and Wm. H. Bliss, 2d, Norwich, Conn., assignor to John Bachelder.

We claim, 1st, The vertical jack, c, and pivoted switch lever, k, both constructed and combined as shown, the switch lever being attached above the axis of the jacks, and arranged with the pattern device, as and for the purpose set forth.

2d, The compound jack lever, c k, constructed as described, in combination with the pattern device and with the mechanism substantially as shown, which actuates the pattern, all for the purpose set forth.

3d, The arrangement of the sleeve, d, jack levers, c, shaft, e, and eccentrics or cranks, f f, substantially in the manner and for the purpose described.

76,037.—Washing Machine.—Daniel W. Bancroft, Marshfield, Vt.

I claim, 1st, The swinging supports, h h, provided with spiral springs, m m, in combination with slots, g g, and shaft, E, substantially for the purpose specified.

2d, The adjustable cross beam, B, to which are hinged the beaters, d d, in combination with hinged arms, f f, shaft, E, swinging supports, h h, and spiral springs, m m, arranged substantially in the manner herein set forth.

76,038.—Mode of Lacing Boots and Shoes.—Wm. Banister and Albert H. Rowell (assignors to themselves and Isaac H. Butts), Lawrence, Mass.

We claim, 1st, The clasp for securing the lacings of boots and shoes, consisting of the plate, B, having the turned up lip, b, attached to its lower portion, the tongue, b', upon its upper edge, and the downward projecting lips, b', upon each side of said tongue, as herein shown and described.

2d, A loop lying flat upon the surface of the leather, and attached to a stud, or its equivalent, said loop being allowed to swing with the motion of the shoe-string, substantially as herein shown and described.

76,039.—Dumping Wagon.—Harvey Barton, Elyria, Ohio.

Antedated March 25, 1868.

1 claim, 1st, The levers, N M, links, O, and slides, J, as arranged, in combination with the bottoms, H', in the manner as and for the purpose set forth.

2d, The bound, D, reach, G, and yoke, F, as arranged, in combination with the brackets, E, for the purpose and in the manner set forth.

76,040.—Horserake.—Henry L. Beach (assignor to Beach Horse Hay Rake Manufacturing Co.), New York city.

I claim, 1st, The combination of the teeth heads, E, and teeth, F, with the jointed bar, rod, or head, D, constructed and operating substantially as described.

2d, The sliding bar, M, in combination with the spring, N, and frame, when the same shall be constructed and operate substantially as described.

3d, In combination with the jointed bar, rod, or head, D, the connections, C, constructed and operating substantially as and for the purposes forth.

4th, Attaching the sliding bar, M, to the frame, so that the same may be moved away from the teeth heads, E, for the purposes set forth.

76,041.—Wire-truss Bridge.—Charles Bender, Hesse Darmstadt, Germany.

I claim, 1st, A bottom chord, consisting of an unbroken main cable and side cables, the latter consisting of as many pieces as there are panels, substantially as and for the purpose specified.

2d, The joints of the bottom chord, consisting of two side plates and a covering plate, as shown in figs. 1, 2, 3, 4, 5, the several parts being constructed and used as and for the purpose herein specified.

3d, The saddle joining the bottom and upper chords, in connection with bottom chords of truss bridges constructed of wire cables, substantially as set forth.

76,042.—Machine for Manufacturing Clouded Yarn.—John W. Bentley, Woonsocket, R. I.

I claim the combination of the additional rolls, H I L, and the change gear, G, with a common spinning frame, arranged and operating substantially as and for the purposes herein shown and described.

76,043.—Reel.—G. Bradway and N. Bradley, Maquoketa, Iowa.

We claim the combination and arrangement of stand, D, spindle, C, and wheel, B, having hooks, e, and worm, h, with wheel, E, pin, i, shaft, m, nut, p, and spring, n, as and for the purpose set forth.

76,044.—Piano Stool.—James Bramble and Hugh M. Deihl, Fort Wayne, Ind.

We claim controlling the hight of the seat of a piano stool by hydrostatic pressure, substantially as described.

76,045.—Draft Regulator.—Joseph W. Branham, Franklin, Ind.

I claim the draft regulator, constructed as described, consisting of the frame, A, having the sheet, B, and the damper, C, to which the inner end of the notched lever, L, is pivoted, having its fulcrum upon the side of the frame, A, at a', said damper being held in any desired position by means of the pawl, d, engaging with the notches, h, of the lever, H, as herein described for the purpose specified.

76,046.—Saw Set.—James F. Brodhead, Rondout, N. Y.

I claim the wedge, D, in combination with the sliding bar, E, plate, C, handle, A B, and gage screw, L, all arranged as described for the purpose specified.

76,047.—Attachment for Sewing Machines.—Charles H. Buck, 2d, West Arlington, Vt.

I claim the binder, constructed as described, consisting of the plate, B, having a tapering shank, and fitting in the dove-tailed recess in the bar, a, its forward end bent down and forming a loop bearing the adjustable guide, e, and its rear end provided with the opening for the reception of the outer end of the plate, C, which is held in place by the slide, d, the forward part of said plate, C, being bent down and forming a loop having guide, e, and placed directly above the loop in the plate, B, as herein described for the purpose specified.

76,048.—Application of an Inner Sole to a Last.—Charles Buffum, Lynn, Mass.

I claim, in combination with a last, devices substantially as described, or their equivalents, for centralizing and holding a sole to the last, the same consisting of the sockets and their springs, and the pins therefore.

Also, the arrangement of the holding socket and its spring, at the toe of the bottom of a last, so as to enable a person, by means of a pin, as described, to secure the upper of a shoe to an insole by passing the pin through the upper and into the socket and spring, as set forth.

Also, the mechanism or combination for holding the sole to the last, such consisting of the grooved and headed pin, the socketed plate, and the plate of rubber or the jawed spring, the whole being substantially as set forth.

76,049.—Hose.—Andrew Carney, New York city.

I claim the constructing of hose, for conducting water, formed of leather or other material of sufficient strength and flexibility, joined, substantially as shown and described.

76,050.—Lever Purchase.—J. B. Case, Fletcher, Vt.

I claim, 1st, A universal joint-lever purchase or lever support, substantially as shown and described and for the purpose set forth.

2d, The lever plate, D, in combination with the trunnions, a, and block, B, and pivot, C, substantially as shown and described and for the purpose set forth.

3d, The block, B, in combination with the stand, A, and pivot, C, and any lever arm, D, substantially as shown and described and for the purposes set forth.

4th, The combination of the set screws, E E, with the groove, F, in the stand, A, and with the block, B, and lever, D, all constructed and operating substantially as and for the purpose shown and described.

76,051.—Carpenters' Plane.—E. M. Chapin and Solon Rust, Pine Meadow, Conn.

We claim the joiners' plow, constructed as described, and consisting of the

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stock, A, having slotted, flanged guides, C, projecting from one side, the fence, B, screw, D, formed with a tenon, d, and fitted with a head, e, and the thumb screws, o' b, provided with collars, c, all arranged and operating in the manner and for the purpose set forth.

76,052.—CUTTER HEAD FOR TENONING BLIND SLATS.—Milton W. Clark (assignor to R. Ball and Co.), Worcester, Mass.

I claim the combination, with the head A, of the cutters, a a' b b' and c c', arranged to operate as describe l, so that, at the same time a tenon is formed by said cutters, an offset may be cut in the shoulder of said tenon, substantially as shown and set forth.

76,053.—BABY JUMPER.—J. H. Coldwell, Poughkeepsie, N. Y.

I claim, 1st, Making the seat bar of a baby jumper longitudinally adjustable on its fulcrum, substantially as herein shown and described.

2d, Making a portion, H, of the railing around the seat of a baby jumper detachable, or so that it can swing open, substantially as and for the purpose herein shown and described.

3d, The arrangement and combination with each other of the base, A, ears, B, seat bar, C, adjustable plate, E, lugs, b, spring, F, and screw, d, all made and operating substantially as herein shown and described.

76,054.—CORDING ATTACHMENT FOR SEWING MACHINES.—Francis B. Contessa, New York city.

I claim, 1st, The combination with the presser bar, A, of the bracket, B, and roller, C, constructed, arranged, and operating with the sewing machine as and for the purpose set forth.

2d, The elastic thimble or band, in combination with the roll, C, substantially as and for the purposes set forth.

76,055.—KNIFE FOR CUTTING STRAW BANDS.—Frederick Coulon, Rockford, Ill.

I claim a knife having the handle, B, and blade, A, the latter being provided with an incline sickle edge, a, curved outwardly, or in a convex line, from the handle to the point of the blade, substantially as and for the purpose specified.

76,056.—MULE FOR SPINNING.—John Cumnock, Salmon Falls, N. H.

I claim the combination for operating the carriage, of a mule in manner as set forth, such consisting of the chain, C, and its impelling and guide wheels, the pinion, e, toothed sector, d, arm, g, the pin, h, and the slotted plate, k, the whole being arranged substantially as specified.

76,057.—HOSE AND PIPE COUPLING.—M. S. Curtis and W. D. Fewkesbury, New York city. Antedated March 16, 1868.

We claim a split or divided and adjustable ring clamp, constructed with its one end recessed, as at n, to receive within it a tongue or lip, m, arranged to project from the opposite end, substantially as and for action or operation as described.

76,058.—SAFETY GUARD FOR FIRE-ARMS.—Benj. B. Cutler, Boston, Mass.

I claim, 1st, The combination of the sliding rod, m, having projection, i, the pivoted plate, d o, curved pivoted lever, a, and springs, s D, all arranged within a recess in the stock, A, to operate substantially in the manner and for the purpose set forth.

2d, The auxiliary spring, b, or its equivalent, substantially as shown and described, in combination with plate, d, rod, m, and lever, a, all as and for the purpose set forth.

76,059.—MACHINE FOR BENDING CARRIAGE CIRCLES.—S. S. Daniels, Kendallville, Ind.

I claim the combination of the hollow former, A, having two or more shoulders, a1, formed upon its face, clamp, C, cam lever, D, slotted and jointed pivote l shaft, E, adjustable lever, G, and flanged and recessed followers, H, with each other, said parts being constructed and arranged substantially as herein shown and described and for the purpose set forth.

76,060.—STEAM PLOW.—J. C. Delavigne, New Orleans, La.

I claim, 1st, The construction and arrangement of the frame, A, of any desired size, in combination with the traction wheels, D, substantially as shown and described.

2d, In combination with the frame and wheels, the shaft, H, formed substantially as described.

3d, The arrangement and operation of the gangs of plows or cultivators, D, and the manner in which the same are controlled, substantially as described.

4th, The vertical protecting rods, E, substantially as and for the purposes herein described.

76,061.—COMBINED FEED TROUGH AND RACK.—Jeremiah Depue, California, Mich.

I claim the feed box, K, and rack, H, in combination with the roof, A, slats, C, button, f, and board, D, arranged substantially as herein shown and described, for the purpose set forth.

76,062.—RAILWAY CHAIR.—Arcule Elms, North Granville, N. Y.

I claim forming the chair for railroad rails in two parts, B and B', which are drawn and held together by their hooks, a a', substantially as shown and described, for the purpose of clamping and holding the rails, A, all as set forth.

76,063.—COMPRESSING AND BEATER PRESS.—George Ertel, Liberty, Ill.

I claim, 1st, The driving wheel, H, formed with a slotted bar, a, and movable tongue, a, when constructed substantially as shown and specified.

2d, The levers, W W', yokes, P and P'', rope, x, collar, z, and pawl, d, all in combination, when constructed and arranged substantially as shown and specified.

3d, The driving wheel, H, levers, W W', platform, M, rock shaft, F, levers, s s' and t, pawl, d, and collar, z, of a compressing and beater press, all constructed and arranged in relation to one another and the other parts of the machine substantially as and for the purpose specified.

76,064.—HOOP SKIRT.—David H. Fanning, Worcester, Mass.

I claim in combination with the pockets, C C, and hoop, B, the clasps, D, provided with lips, b b and c c, the former extending laterally upon and clasping the edges of the pockets, as shown in fig. 2, the latter inclosing and clasping the hoop, as shown in fig. 3.

76,065.—BOOKBINDERS' ROLL.—John Feeley, New York city.

I claim a bookbinders' roll, consisting of the handle, A, which carries the revolving disk, C, and of the annular or circular type plate, D, secured to the face of the disk, all made and operating substantially as herein shown and described.

76,066.—DOOR LOCK.—P. S. Felter, Cincinnatus, N. Y.

I claim, 1st, A series of bent tumblers, a or a', in connection with a flat or saw-plate key, E, notched at the sides or edges, an arbor, D or G, and thimbles F or H, arranged to operate conjointly one arbor, D, with the other, G, when the lock is to be operated from both sides of a door, as shown, or to operate separately, each arbor with its concomitant parts, when the lock has but one key hole, substantially as shown and described.

2d, The combination of the cam or eccentric, C, with the arbor, D or G, and thimble, F or H, and the sliding tumblers, a or a', all arranged substantially as and for the purpose set forth.

76,067.—CATTLE CAR.—Eugene Fontaine, Fort Wayne, Ind.

I claim 1st, The adjustable platform, B, in combination with the pivoted bars, h, for supporting said platform in the top of the car, and with the slotted horizontal arm, e, for holding the same in position when lowered to the center of the car, as herein shown and described.

2d, The platform, B, having the pivoted bars, h, when adjusted by means of the single longitudinal shaft, D, and the chains, C, as herein described for the purpose specified.

76,068.—SLATE FRAME.—Jas. H. Foote, Pittsfield, Mass.

I claim the case, c, in combination with the double-acting spring, e, and mortised frame, a, substantially as described and for the purpose specified.

76,069.—GAS BURNER.—C. S. Ford, Philadelphia, Pa.

I claim, 1st, The application to gas burners of a universal articulated joint, composed of body, A, nut, N, and projection, P, burner, B U, and head or burner, B' B', the whole constructed and operating in the manner and for the purpose set forth and described.

2d, The peculiar construction of body, A, combined with screw, s c, for the purpose described and set forth.

76,070.—BACK AND ABDOMINAL SUPPORTER.—Mrs. John Ford, Salem, Oregon.

I claim the abdominal supporter, constructed as described, consisting of the band, B, provided with the shoulderstraps, F, and thighstraps, G, and having a gathered center, H, upon each side of which the eyeleted strips, I J, are secured, the ends of said band provided with the eyeleted strips, L, and clasps, C D, all arranged as described, whereby the supporter can be converted into a band, to be used after confinement, as herein set forth.

76,071.—STEAM-ENGINE GOVERNOR.—Leonard F. Fuller, Providence, R. I.

I claim, 1st, The disk, M, and tongue, L, in combination with the frame, N, substantially as herein described, and for the purpose set forth.

2d, The combination of the segment gear wheel, F, gear wheel, G, and barrel, H, arranged substantially as specified and for the purpose set forth.

3d, The spring, S, collar, T, and barrel, H, arranged substantially as described and for the purpose set forth.

4th, The spring, R, with tongue, L, substantially as described, and for the purpose set forth.

76,072.—PUMP.—G. W. Gardner and Oliver Higgins, Napoleon, Ohio.

We claim, 1st, The internal movable cylinder, H, having diaphragm, h, and openings, m m' a a', in combination with the pistons, I I', and passage, g, all as and for the purpose set forth.

2d, The tube post, A, in combination with the internal movable cylinder, H, lever, C, barrel, G, pump rod, D, and pistons, I I', as and for the purpose set forth.

76,073.—COMBINED HAY SPREADER AND COCKER.—R. T. Gill, Poughkeepsie, N. Y.

I claim, 1st, An improved machine for cocking and tedding hay, formed by the combination of the gatherer, G H J K, and carrier, L, or their equivalents, with the receiver box, N, having an upper grate, S, a lower grate, Y, and a swinging door, n', substantially as herein shown and described.

2d, The receiver box, N, furnished with an upper grate, S, a lower grate, Y, and a swinging door, n', substantially as herein shown and described.

3d, The combination and arrangement of the arm, y', connecting rod, Z, lever, W, connecting rod, V, and lever, U, with each other and with the grate Y, grate, S, and swinging door, n', substantially as herein shown and described and for the purpose set forth.

76,074.—SORGHUM EVAPORATOR.—Thomas Gillespie, Jr., Paulding county, Ohio.

I claim the combination of the furnace, A, tubes, B, and tank, C, substantially as described.

76,075.—WAGON JACK.—T. L. Goble, Orange, N. Y.

I claim the combination of the base bar, A, stationary standard, B, pivoted notched bar, C, pivoted eccentric lever, D, and pivoted standard, E, with each other, substantially in the manner herein shown and described and for the purposes set forth.

76,076.—SEWING MACHINE.—A. W. Halbert (assignor to himself and J. F. Stark), Taylor, N. Y.

I claim, 1st, The driving wheel, C, the shuttle carrier, e, connected therewith by the wrist, d, and the oscillating shuttle guide box, g, pivoted by the tubular pivot, k, constructed, arranged, and operating substantially as and for the purpose herein described.

2d, The combination of the wheel, C, the shuttle carrier, e, the feed lever, m, the slide gage, n, and the feed plate, o, all arranged and operating substantially as and for the purpose herein described.

76,077.—BED BOTTOM.—L. K. Hawes, Whitewater, Wis.

I claim, 1st, Slat, A, elastic strap, B, bent staple, C, and clamp, D, in combination, substantially as described.

2d, Securing strap, B, to slat, A, by the serrated clamp, D, substantially as described.

3d, Staple, C, with button, E, in combination, substantially as described.

76,078.—HORSESHOE.—A. S. Hopson, Plainview, assignor to himself and S. C. Harlan, Red Wing, Minn.

I claim, in combination with the horseshoe, having slots or openings at the toes and heel, the calks, when provided with a rib or projection, and secured by wedges or keys, substantially as and for the purpose specified.

76,079.—BOOT CRIMPER.—A. J. F. Howard, Milford, Mass.

I claim the construction of the movable jaws, f f, that is, as made with the elongated shanks, g g, for the purpose of lowering the jaws, f f, below the top of the clasp, a, and forming the spaces, h h', as and for the purposes before described.

76,080.—FASTENING FOR CARRIAGE CURTAIN.—J. Huston, Jr., and O. W. Stanford, Sharonville, Ohio. Antedated March 23, 1868.

We claim the plates, A and B, and thumb nut, C, in combination with spring catch, D, constructed and operating substantially as and for the purpose described.

76,081.—GATE.—J. L. Janeway, Flemington, N. J.

I claim the employment, in combination with the sustaining post, A, and gate, of the swivelling caster wheel stands e d e d, the whole arranged and operating as described, for the purpose set forth.

76,082.—BELT HOOK.—F. J. Jones (assignor to himself and Adolph Dick), Detroit, Mich.

I claim the construction of a double hook and sleeve, substantially as and for the purposes herein set forth and described.

76,083.—SHAFT BEARING OR MILLSTONE BUSH.—S. Kime, McVeytown, Pa.

I claim, 1st, The arms, D, hung at one end to studs, e, and bearing at their opposite extremities the friction rollers, B, when said arms are provided with adjusting screws, g, passing transversely through them, and adapted to rest against the inner face of the side of the box, A, all constructed, arranged, and operating as and for the purpose specified.

2d, The stuffing box, H, and follower, G, substantially as shown and described, in combination with the box, A, containing the rollers, B, and hinged arms, D, all substantially as shown and described, and for the purpose of being used as a millstone bush, all as set forth.

3d, The set screw, g, in combination with the hinged arms, D, rollers, B, box, A, and stud, e, substantially as shown and described, for the purpose of adjusting the rollers, B, all as set forth.

76,084.—MATCH BOX.—J. Kirchfield and F. Heyl, Riegelsville, Pa.

We claim, 1st, The wheel, Dx, fitted in the box, B, in connection with the opening in the end of the box, and the slide, g, all arranged substantially as and for the purpose specified.

2d, The cutter, e, attached to the lid, D, in connection with the opening in the end of the compartment, c, substantially as and for the purpose set forth.

3d, The combination of the box, B, hinged lids, A D, wheel, Dx, slide, g, and cutter, e, all arranged substantially as and for the purpose set forth.

76,085.—UMBRELLA.—Wm. Lang, Brooklyn, E. D.

I claim the umbrella runner provided with a fastening device consisting of the channel, a, and catch or lever, D, in combination with the projections, B, substantially as described.

76,086.—SCISSORS SHARPENER.—W. H. Leach (assignor to himself and S. I. Pressey), Dorchester, Mass.

I claim the inclined file, C, in combination with the parallel blocks, A B, screw or screws, D D, and spring, d, all constructed, arranged, and operating substantially as and for the purpose set forth.

76,087.—COMPOUND FOR WELDING AND REFINING IRON AND STEEL.—Julius Lehmann, Ill.

I claim a composition for welding and refining steel and iron, and for restoring burnt steel, made substantially in the manner and of the ingredients herein set forth.

76,088.—FORMATION OF JOINTS OF STEEL OR IRON PLATES.—E. F. Ligon, Demopolis, Ala. Antedated March 20, 1868.

I claim the application of the coating of copper to the bent-over edges of steel or iron plates, as described, for the purpose of forming a tight joint, less liable to oxidation than steel or iron, as herein shown and described.

76,089.—LAMP BURNER.—John Magee, Chelsea, Mass.

I claim a stationary cone, B, in combination with a perforated chimney-holder, E, all constructed and arranged substantially as and for the purpose set forth.

76,090.—SHUTTLE.—E. P. Marble, Sutton, Mass.

I claim the spindle, B, and head, C, provided with the inclines, as shown, in combination with the volute spring, D, arranged and operating as and for the purpose set forth.

76,091.—SWING.—Samuel E. Martin, Shamokin, Pa.

I claim the car, C, suspended by rods, D, from transverse bars, B, the lower ends of the rods, D, being adapted to turn upon wrist pins, E, fixed in the sides of the car, C, when the two rods, D, supporting each end of the car, are fitted to turn upon one of the transverse bars, B, B, as described, whereby, as the car, C, is swung back and forth, its horizontal position is retained.

76,092.—JOURNAL BOX.—I. D. Mathews, Worcester, Mass.

I claim, 1st, The combination with the inner box, I, of the shell, F, substantially as and for the purposes set forth.

2d, The combination with the shell, F, and the points or projections, g g, of the collars, O O, and oilers, 1 1, substantially as and for the purposes set forth.

3d, The combination with the bearing or journal box of a shaft, of one or more collars, O, and oilers, 1, substantially as and for the purposes set forth.

4th, The combination of the points, g g, with caps, F' F', and the top part, L, of the box, I, substantially as and for the purposes set forth.

5th, The combination of the oilers, 1 1, with the collars, O O, as described, whereby they draw against the points or projections, g g, which scrape the oil from the oilers, as set forth.

6th, The combination of the shell, F, and caps, F' F', with the collars, O O, and oilers, 1 1, and shaft, N, substantially as and for the purposes set forth.

76,093.—CARVING MACHINE.—Alexander McCreight, Tranquility, Ohio.

I claim the pivoted lever, I, having the curved slot, L, fitting upon the pin wheel, J, said lever connected to the pivoted tool stock, O, by means of the adjustable bar, M all operating as described, whereby the curved slot in the lever, I, by the operation of the pin wheel, imparts a vibrating motion to the cutters, P, to form the slots, U, as herein shown and described.

76,094.—CAST-IRON CHIMNEY.—A. W. McMillen (assignor to himself and A. Adams), Chicago, Ill.

I claimed, 1st, The cylindrical cast-iron chimney, constructed substantially as described.

2d, Constructing and connecting the several sections, B, substantially as described.

3d, Connecting and supporting the section, A, with and upon the base, C, by means of the collar, I, substantially as specified.

4th, Connecting the section, D, with the base, C, substantially as and for the purposes specified.

5th, The soot box, F, with or without the opening, H, in combination with the sections, A B, and base, C, substantially as described.

6th, The adjustable shield or cap, E, in combination with the sections, A B D, and base, C.

7th, The guard, G, in combination with the sections, A B, and base, C.

76,095.—END GATE FOR WAGONS.—Enos S. Miller, Baltimore, Ohio.

I claim the combined gate and feed trough, constructed as described, and consisting of the bottom, m', having end pieces, B, adapted to receive pieces i n, and provided with buttons, g, and hooks, h j, when said pieces, B, are notched at, l, to fit over the projections, f', of the slotted rest bar, f, and are furnished with spring hooks, e, which catch under pins, d, fixed in the sides, A, of the wagon body, all arranged and operating as described for the purpose set forth.

76,096.—WINDOW-SASH FRAME.—James H. Osgood, Boston, Mass.

I claim the combination, with the sash or frame respectively, of grooves, d, constructed as described, and the rollers, e mounted on fixed bearings, and operating together as and for the purpose herein described.

76,097.—FIRE ESCAPE.—John Paar, New York city.

I claim the metallic or non-combustible box, f g h, doors, K K K', ladder, I, and metallic balconies, L, combined and arranged together substantially as and for the purposes described and set forth.

76,098.—IRONING TABLE.—Horace Park, Columbus, Ohio.

I claim the combination of the top, A, bridge, C, braces, D, rack, B, and legs, F, all arranged as described.

76,099.—RADIATING DRUM STOVE.—J. H. Patterson, Glen's Falls, and H. B. Northrup, Sandy Hill, N. Y.

We claim the construction and arrangement of the semi-circular drums, D D', at the top and bottom of the stove, corresponding to its back, B, and connected by means of the vertical pipes, E, and pipe, F, the latter extending through the drum, D, to the chimney, and said drum connected to the stove by the pipe, G, as herein described for the purpose specified.

76,100.—ORE CRUSHER.—J. Reese (assignor to himself and R. C. Totten), Pittsburgh, Pa.

I claim, 1st, The crushing jaw, c', provided with the square opening, d, in combination with the cam, d', friction roller, m, and adjustable jaw, c, all constructed substantially as shown and described.

2d, A square head or T-head bolt, e', in combination with a correspondingly-shaped groove, s, in a stationary jaw for adjusting the stationary jaw of an ore crusher, substantially as set forth.

76,101.—PRESS.—C. O. Ritchie and J. H. Ritchie, North Madison, Ind.

We claim an improved press, composed of the mattrix, G, provided with binding rods, c c, the follower, E, the slotted uprights, B and C, with their set screws, and the cam lever, D, all combined and arranged substantially as and for the purposes shown and described.

76,102.—PORTABLE FENCE.—W. E. Roberts, North Coventry, Pa.

I claim the post composed of the uprights, B, cleats, C, base, D, and pins, G, for the purpose and substantially as herein specified.

Also, the stop, E, and button, F, for the purpose and substantially as herein described.

Also, the combination of the rails, A, uprights, B, cleats, C, base, D, stops, E, buttons, F, pins, G, and cleat, H, when constructed in the manner and used for the purpose substantially as herein specified.

76,103.—WOOD BORING MACHINE.—Almon Roff, Southport, Conn.

I claim, in combination with a central stationary screw or shaft, the feed nut, K, whether locked to the rotary arms, or operated by the crank, L, constructed to operate substantially as set forth.

76,104.—NAIL MACHINE.—George W. Sargent, New York city.

I claim the levers, C and D, connecting rods, 1, 2, 3, 4, 5, wheels, A' and E, with eccentric pins, P P' P'', arranged to operate the wooden shank and vertical hammer, G, adjustable anvil, H, horizontal hammers, F F', and cut-off bar, I, substantially in the manner and for the purpose set forth and shown in the drawings.

76,105.—STEERING APPARATUS.—Charles H. Sawyer, Buxton, Me.

I claim the steering apparatus, as herein described, having the wheel shaft, B, with its right-and left screw, d, and the two small double gears, a b, the larger gear, D, with the teeth on the inner periphery thereof, as and for the described purposes.

76,106.—STOP COCK.—Carl Schultz and Thos. Warker, New York city. Antedated March 18, 1868.

We claim the stop cock, herein described, the same having its body constructed of glass, or other vitreous material, with a valve, B, provided with recess, h, and lips, i, for connection to the operating stem, and with a lateral passage, d, beyond the valve seat of the supply channel, a, the same valve thus having two faces and two seats, and closing the passage, a, by its direct thrust, and the channel, d, by its lateral expansion, when all parts are constructed and operating substantially as described.

76,107.—VEGETABLE COLORING MATTER.—Dr. Charles Seidel, New York city.

I claim an indelible vegetable fluid, having for its basis the pigment of the cashew nut, as a new combination of matter, substantially as and for the purpose described and set forth.

76,108.—WATCHES FOR CANES, UMBRELLA HANDLES, ETC.—Simon B. Simon, Washington, D. C.

I claim the arrangement of the extension movements, A, B, C, D, E, G, H, J, K, L and M, combined and operating between the plates, W and T, as herein described and for the purpose set forth.

76,109.—SILK CLEANING KNIFE.—George Singleton, Paterson, N. J.

I claim the improved parallel-acting silk knife, composed of the blade, S, holder, B, and plate, A, the blade, S', holder, E, foot, F, slotted hole, I, screw, H, lugs, K and L, screw, M, combined and arranged in the manner and so as to operate substantially as set forth.

76,110.—BOX AND BAGS FOR PACKING BUTTER, ETC.—John D. Smedley, Chicago, Ill.

I claim, 1st, The process of preparing paper boxes and paper bags for the purpose of packing lard butter, or fluids of an oleous character, in the manner as herein described.

2d, As a new article of manufacture, a paper box or bag, when constructed and prepared in the manner and for the purpose herein described.

3d, Hermetically sealing paper boxes, when constructed and prepared as herein described, by means of creases, d, and a mixture of wax and stearine, substantially as herein set forth.

4th, Lining a containing vessel, to hold packages of perishable substances, with a paper bag, when constructed and prepared in the manner herein set forth.

5th, Packing butter, lard, etc., in containing vessels, either in bulk or packages, when said containing vessels are lined with paper, or its equivalent, prepared in the manner herein described.

76,111.—MAKING HAND AND OTHER CARDS.—E. L. Sprague (assignor to himself and Henry Eddy), Leicester, Mass.

I claim, 1st, A card sheet for supporting the teeth, a, in hand and other cards, made of three strips or veneers of wood, substantially as and for the purposes set forth.

2d, A card sheet made of one or more strips or veneers of wood, and one or more thicknesses of leather.

3d, A card sheet made of two or more veneers or strips of wood, so arranged and glued or cemented together as to have the grain of the wood of the separate veneers cross each other at right angles, or nearly so, for the purposes stated.

76,112.—CAR COUPLING.—Theophilus Steinhauer, Syracuse, N. Y.

I claim an improved self-acting car coupling, formed by the combination of the body, A, and hopper-shaped mouth, B, bars or rods, C, springs, D, plate, E, coupling pin, F, coupling link, G, plate and pin guide, H, and ping, I, with each other, and with the body of coupling, said parts, A, B, C, D, E, F, G, H, I, being constructed and arranged substantially as herein shown and described, and for the purpose set forth.

76,113.—THREAD AND TWINE CUTTER.—J. W. Strange, Bangor, Me.

I claim a thread and twine cutter, constructed with a metallic stock, A cast upon and embracing the ends of cutting blade, B, with the shields, a a and screw, b, all substantially as described and shown.

76,114.—APPARATUS FOR CARBURETING AIR.—James Stratton, Philadelphia, Pa.

I claim the combination of the tank, A, cylinders, B and D, and the intervening cotton batting, C, substantially as and for the purpose set forth and described.

2d, The perforated pipe or hollow shaft, E, in combination with the cylinders, B and D, substantially as shown and described, and for the purpose specified.

76,115.—HYDROCARBON BURNERS.—James Stratton (assignor to himself, Wm. Wallace and Robert N. Wetherell), Philadelphia, Pa.

I claim the downward projecting straight burner, A, its lower end so perforated that the jets will flow in horizontal radial directions, in combination with the vertical pipe, B, the said parts being constructed and arranged to operate together, substantially as and for the purpose described.

76,116.—WINDOW FRAME.—Otto Edward Henry Sturcken, San Francisco, Cal.

I claim, 1st, A swing side strip, B, combined with the adjustable cord fastening, D, and grooved sash, E, all constructed and operating as described.

2d, The lock, C, in combination with the sash, E, strip, B, fastening, D, as described and for the purposes set forth.

76,117.—CLOCK.—S. B. Terry (assignor to himself and Waterbury Clock Co.), Waterbury, Conn.

I claim a clock movement in which the count wheel is placed upon a shaft or its equivalent, independent and separate from the main pinion shaft, but connected therewith through pinion and gear, substantially as described for the purpose specified.

76,118.—ROCK DRILL.—James H. Thomas, Lacon, Ill.

I claim, 1st, The tube, E, having the drill, D, when secured to the cross heads, F, upon one side, by means of the ratchet wheel, g, fitting between the horizontal plates, the clamps, m, n, upon the cylinder head, as herein described for the purpose specified.

2d, The combination, with the drill, D, and the tube, E, of the plates, e e, cams, d d, piece, f, ratchet wheel, g, spring pawl, i, and inclined rod, J, and band, h, arranged and operating substantially as described.

76,119.—MOUTH PIECE FOR CIGARS, ETC.—Wm. Thompson, Dublin, Ireland.

I claim, 1st, The provision in mouth pieces for cigars and pipes, of a chamber containing cotton wool, C, or its equivalent, through which the smoke has to pass on its way to the mouth, substantially as and for the purpose hereinbefore set forth.

2d, The employment of a case for containing the cotton or other wool, constructed and operating substantially in manner hereinbefore described, with reference to figs. 3, 4 and 5, on the accompanying drawing.

76,120.—MILK SHELVES.—Wm. Veber, Jr., Shingle Creek, N. Y.

I claim the tubular shaft, A, arranged with reference to the milk pans and the building or milk house, substantially as shown and described, for the purposes set forth.

76,121.—DINNER KETTLE.—John Wagner, Cumberland, Md.

I claim a dinner kettle composed of a series of cups or vessels, fitted one within the other and connected together by the bail and suitable catches, in the manner substantially as herein shown and described.

76,122.—MACHINE FOR REMOVING BURRS FROM HAIR.—F. Walpert, Baltimore, Md.

I claim the combination of the frame, A, having feed board, D, the spring, c, pivoted board, C, and rotating covered beater, B, all constructed, arranged and operating as and for the purpose described.

76,123.—DRILL GAGE.—Wm. C. Wells, Newark, N. J.

I claim, 1st, In a drill gage, the employment of a movable or rotating blade A, in combination with a V-shaped or concentric guide, B, said blade being movable to or from the end of the said guide, above which it is placed in a line parallel with the vertical plane of the said guide, B, for the purpose of enlarging or diminishing the area of the angle which it is intended to describe, substantially as herein specified.

2d, The projection, c, on the blade, A, and projection, c', on the supporter m, in connection with the stud screw, D, fig. 3, which conjointly forms a pivot joint, when the said parts are attached to a concentric guide, as and for the purpose shown and described.

76,124.—BREAST PAD.—Daniel K. Wertman, Centralia, Pa.

I claim the breast pads, A A, constructed as described, and consisting of the plates, e f, riveted together, the covering, d, and filling, b, when said pads are secured to the breast strap, B, by means of screws, a, all arranged as described for the purpose specified.

76,125.—STEAM JET HEAD FOR CLEANING BOILER FLUES.—Joel M. Wheeler, Oxford, Conn.

I claim, 1st, The reversible ring, B, with the stop, i, substantially as described.

2d, The combination of the parts, A B C, with the pipe, K, substantially as set forth.

76,126.—MODE OF SETTING WHEELS ON AXLES.—M. S. Wilcox, Union Mills, Ind.

I claim, 1st, The bed piece, A, and the standards, B B', in combination with the straight edge and scale, D, constructed and operating substantially as and for the purposes described.

2d, The clamp hooks, b b, in combination with the perpendicular standards B B', as and for the purpose set forth.

76,127.—POTATO DIGGING MACHINE.—Moses H. Wiley, Boston, Mass.

I claim the combination and arrangement of the reciprocating screen, the excavating comb and the rotary lifter, and the mechanism applied to each for operating it, substantially in manner as described, the whole being applied to a frame, A, and its wheels, B C, so as to be operated thereby, as and for the purpose explained.

76,128.—MEASURE FOR CUTTING DRESSES.—Susan R. Windle, Chillicothe, Ohio.

I claim, 1st, The chart provided with scales of part on its edges and surfaces, and of the herein described contour, for the purpose of facilitating the cutting of dress patterns, as specified.

2d, The dart point, H, and inner dart point, H', of smaller dimensions and scales upon their edges, for measuring the parts of the pattern cut out, substantially as and for the purpose set forth.

76,129.—UMBRELLA.—Wm. W. Winter and Theodore Mueller, Philadelphia, Pa.

We claim the expanding drip-cup, C, the ribs of which form the loose ends d, of a series of springs, a, in combination with the closing ring, c, substantially as shown.

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76,130.—ENGINE LATHE FOR TURNING SHAFTING.—Aurin Wood, Worcester, Mass.

I claim, 1st, The combination with the auxiliary rest, E, of the slide pieces E' H, and hinged adjustable tool rests or supports, G G' and H', substantially as and for the purposes set forth.

76,131.—STEAM ENGINE VALVE GEAR.—De Volson Wood and Stillman W. Robinson, Ann Arbor, Mich.

We claim the combination and arrangement of the piece, C, trippet, B, and piston rod. A, as and for the purposes described.

76,132.—POST-HOLE HOLLOW AUGER.—Samuel H. Yoker (assignor to himself and Marion E. Clark), Tipton, Ind.

I claim, 1st, Principal cutters, x x, pivoted on rim, P P, by pivots, n n, in combination with hollow auger, D.

2d, The cutters, x2 x2, with slots, H H, in combination with pin, K, in principal cutters, x x, substantially as herein set forth and for the purposes specified.

76,133.—COMPOUND FOR USE IN SAFE AND POWDER MAGAZINE.—Edward H. Ashcroft, Lynn, Mass.

I claim the salts or chemical compounds herein described, with or without liquid acids, or any other material substantially the same, as and for the purposes set forth.

76,134.—TANNING.—Henry W. Adams, Milton, Pa.

I claim the use of the revolving tanners, E F G, armed with pins and working partially submerged in tan liquor, in the vats, B C D, for the purpose of tumbling hides and skins against the said pins, and forcing out the exhausted water from their centers, and working into them fresh tannin, substantially in the manner and for the purposes set forth.

76,135.—HARVESTER CUTTER.—E. M. Allen, Darlington, Md.

I claim securing knives to cutter bars of reapers or mowers, by means of the elasticity of said knives, substantially as and for the purposes herein set forth.

76,136.—HOT-AIR FURNACE.—Jonathan Amory, West Roxbury, Mass.

I claim the combination of the fire chamber, B, the combustion chamber, C, the curves, D and E, and the heating tubes, F, constructed and arranged substantially as described.

76,137.—STRAW CUTTER.—J. J. Andrew, Saltilloville, Ind.

I claim the shaft, B, provided with its balance wheel, screw thread and crank, in combination with the knife, E, and bar or rod, J, as and for the purpose set forth.

76,138.—INKSTAND.—Herbert L. Andrews, Chicago, Ill.

I claim, 1st, The reservoir, B, provided with one or more projections, a, in combination with the guard, D, provided with corresponding indentations and annular grooves beneath, substantially as specified.

2d, Raising a ridge or border around the upper surface of the lid or cover, so as to make it concave or dish form, to form a cup to hold loose pens, substantially as described.

76,139.—STEAM ENGINE.—Nathan Atherton, Philadelphia, Pa.

I claim the curved ring, C R, beveled wheels, B V and B V', cross head, C H, guide, G, and piston rod, P R, all arranged as described, for the purpose of changing reciprocating motion into rotary, and producing a continuous motion at right angles, and overcoming friction.

76,140.—STEAM ENGINE.—Cyrus W. Baldwin, Boston, assignor to Lafayette Huntoon, Milford, Mass.

I claim the arrangement of puppet valves, with reference to that class of steam engines in which two cylinders of different capacities, and exhausting from one to the other, are employed, substantially as herein shown and described.

Also, the arrangement of the valves, their casings, and the steam passages, in relation to each other, and operating essentially as before explained.

76,141.—COTTON BALE TIE.—J. W. Barnum, New Orleans, La.

I claim the device herein described, to wit, the plate, A, when provided at its ends with cylindrical supports, B B', the opening, C, between said supports, and tongues, D D', for the strengthening of the supports, B B', as and for the purpose set forth.

76,142.—COTTON BALE TIE.—J. W. Barnum, New Orleans, La.

I claim the device herein described, consisting of the two supporting curved surfaces, A B, the projecting arm, C, provided with the head or shoulder, D, the whole being constructed as described and constituting a new article of manufacture for the purpose set forth.

76,143.—COTTON BALE TIE.—J. W. Barnum, New Orleans, La.

I claim the combinations of the bars, A A', when provided with the notches a a', with the cylinder, B, or its equivalent, as shown at fig. 3, substantially as described for the purpose set forth.

76,144.—COTTON BALE TIE.—J. W. Barnum, New Orleans, La.

I claim the half cylinders, A A', when placed in relation to each other, as herein described, and secured in position by the plates, B B', when the latter are perforated so as to receive the key, C, at one of their ends, as herein described for the purpose set forth.

76,145.—COTTON BALE TIE.—J. W. Barnum, New Orleans, La.

I claim the cylinder, A, when provided with the aperture, B, the flanges, C C', in which are holes, E E', for the reception of the bolt or key, F, the whole being constructed and operating as described for the purposes set forth.

76,146.—COTTON BALE TIE.—J. W. Barnum, New Orleans, La.

I claim the cylinder, A, when provided with the two projecting plates, B B', in which are cut the notches, C, as herein described, for the purpose set forth.

76,147.—SAW GUMMING OR TOOTHING MACHINE.—Abraham Bartholt, New York city. Antedated Oct. 1, 1867.

I claim, 1st, The combination with a reciprocating punch and suitable die, of an automatic graduating feed to the saw plate, substantially as specified.

2d, In combination with the lever, K, of a friction feed or driving device to the saw plate, the adjustable stop, L, with its ratchet wheel, N, and pawl, P, or the equivalents of these devices, for giving at pleasure a graduating or uniform feed to the plate, essentially as herein set forth.

3d, The adjustable automatic feed, constructed and operating substantially as shown and described, in combination with a circular saw plate holder and driving machanism, as set forth.

4th, The adjustable spring presser, U, in combination with a revolving plate holder and its driving mechanism, for operation in connection with a reciprocating punch, and relatively to the die thereof, essentially as shown and described for the purpose or purposes specified.

76,148.—FOLDING COUCH.—A. John Belt, Cincinnati, Ohio.

I claim, 1st, The hinged and folding bedstead, A A', BB', C, D, E, d d', e e', capable of extension by means of the bars, F F', G, all substantially as described.

2d, The combination of hinged folding and extensible bedstead, as above claimed, with the bottom, I, either with or without the permanent mattress, J.

76,149.—SEALING CANS AND JARS.—John Bellerjeau, Philadelphia, Pa.

I claim, 1st, The cap or top, C, having clasping springs, D, and the body, A, with the bevel flange, B, combined and operating substantially as described.

2d, The clasping springs, D, and hook or hinge, F, in combination with the cap or top, C, and the body, A, having flange, B, and operating substantially as described.

3d, The combination of the wedge, H, hooked bar or strip, G, and body, A, having angular flange, B, substantially as described, for the purpose specified.

76,150.—NAILING MACHINE.—Lyman R. Blake, Boston, and Asa S. Libby, Lawrence, Mass.

We claim a work supporting horn, substantially as described, in combination with a mechanism which operates to drive nails or pins by pressure or percussion.

Also, in the aforesaid combination, arranging the horn so that it can be rotated.

Also, in the aforesaid combination, arranging the horn so that it can yield and move in a vertical direction, substantially as described.

Also, the combination with the presser foot, of mechanism which operates by reason of any change in hight, at which the presser foot rests on the stock to automatically cut nails or pins from material supplied for that purpose, to a length proportioned to the thickness of the work at the place where the presser foot operates.

Also, in combination with mechanism by which nails are supplied to the action of a nail or pin driving mechanism, means for automatically driving the nails in a direction which is inclined in the general direction of the row of driven nails.

Also, means for automatically driving each nail in an inclined direction opposite to the inclination of the driven nail preceding, substantially as described.

Also, combining with the presser foot or other device resting on the surface of the stock, and with the nail driver, means for automatically changing the position of the operative end of the driver, so that the point to which said end will descend at each stroke will depend upon the thickness of the stock at the point where operated upon, and will have a definite relation to the surface of the stock at each descent of the driver.

76,151.—PORTABLE WIRE FENCE.—Louis W. Bosart, St. Marie, Ill.

I claim, 1st, In combination with the wires, C, a corresponding number of capstans, B, through the shafts of which the wires pass, and around which they may be wound, substantially as and for the purpose set forth.

2d, The combination of the wires, C, corner posts, D, intermediate triangular trestles, boards, F, and strips, E, constructed and arranged substantially as described.

3d, The combination of the frame, A, capstans, B, wires, C, and posts, D, arranged substantially as described.

76,152.—PRINTING WALL PAPER.—Peter H. Bowers, Brooklyn, N. Y.

I claim in the printing of wall papers, the use or employment of natural wood, properly prepared, as a type from which to print.

76,153.—GOVERNMENT REVENUE STAMP.—Geo. W. Bowlsby, Monroe, Mich.

I claim 1st, Stamping the cigars themselves, in bulk, substantially as described, or any colorable modification of the same, in contradistinction to stamping the box as now done.

2d, A stamp so made as to be adapted to said purpose, and substantially as described.

3d, The stamping of cigars directly upon the cut ends, to prevent damage to the body of the cigar.

76,154.—CORN SHELLER.—Christian H. Brady, Mount Joy, Pa., assignor to himself and Wm. Brady.

I claim, 1st, The arrangement of the semicircular shelling plates, K, with their dividing plate, k, keel, R, in combination with the spirally inclined and curved blades, l, centrally united at P, for a pin, p, to support a coiled spring, constructed substantially in the manner shown, for the purpose set forth.

2d, In combination with my semicircular plates, K, arranged as aforesaid, the bearing plates, F, for the pin, p, said plate, F, being also provided with cross arms, E E', and bearings for the guide rods, h, in combination with the annular handled rims, C C, and their socket bearings, all arranged in the manner shown and specified.

3d, In combination with the foregoing revolving frame the use of a stationary case, A A, with its standard, spout, and set screws, arranged in the manner shown, for the purpose set forth.

76,155.—PORTABLE DERRICK.—G. C. Brown, Philadelphia, Pa.

I claim the portable derrick composed of the head, with its cap and sheaves, sockets and legs, the whole arranged as and for the purpose set forth.

76,156.—STILL.—Franklin P. Bush (assignor to himself and Jeptha Garrard), Cincinnati, Ohio.

I claim the vapor discharge pipe, D, inclosed within the cold blast pipe, E the whole being arranged and adapted to operate in the manner and for the purpose set forth.

76,157.—TELEGRAPHIC INDICATOR.—Edward A. Calahan, Brooklyn, N. Y. Antedated March 23, 1868.

I claim, 1st, The transmitting instrument, formed of a disk, in combination with the arm, e, and undulating edge of the metallic ring, the parts being connected and operating as and for the purposes set forth.

2d, The escapement and arm, constructed as specified, in combination with the armature, magnet, clock work, and dial, as and for the purposes specified.

76,158.—HAIR PICKER.—Frank Calvert (assignor to himself and Stephen W. Huse), Lowell, Mass.

I claim, 1st. Untwisting hair rope by running it the reverse from the twist, so that the uniwisted part may be operated upon continually and simultaneous with the untwisting, for the purposes substantially as described and set forth.

2d, The radiating concentric toothed cylinder, g, in combination with the can or hair receptacle, y, for the purpose as described and fully set forth.

3d, The can or hair receptacle, y, with its nose, a', or their equivalents, when arranged to operate substantially as described and fully set forth.

4th, The application and arrangement of the fan and cleaner, q, clearer or finisher, j, radiating concentric toothed cylinder, g, fluted draft and feed rolls, r and r', s and s', t and t', and hair receptacle, y, when arranged to operate substantially as described and fully set forth.

76,159.—COUPLER FOR ORGANS, ETC.—R. W. Carpenter, Chicago, Ill.

I claim a simple lever coupling formed from a single rod bent and applied substantially in the manner shown and described.

76,160.—SHINGLE MACHINE.—J. F. Chambers, Calistoga, Cal.

I claim the combination and arrangement of the dog, b, movable table, U, eccentric shaft, a, levers, W, for clamping and holding the shingle while it is being shaved; and in combination with the parts above claimed, the sliding frame, h, and knife, l, for shaving the shingle.

Also the combination and arrangement of the flat shaft, c, pinion, g, wheel f, ratchet, e, and pawl, d, to alternately raise and lower the end of the table, U, to shave the shingles tapering.

76,161.—TOOTH PLUGGER.—Edwin Coburn, Jr., Lewiston, Me.

I claim, 1st, The rod, c, passing longitudinally through the cylinder, C, and having its cords, d and e, for the purpose of making the tool double in its operation, as herein set forth.

2d, In connection with the rod, c, the hammer, i, with its hinged spring arm, k, and the inclined piece, o, as and for the purposes set forth.

3d, The means of making the rod stationary, as shown in figs. 1 and 4, as described.

4th, The method of stiffening the coil, d, as shown in figs. 1 and 3, as set forth.

5th, Constructing a tooth plugger as described, so that the blow of the hammer, i, shall operate to compress the filling of a tooth when either a pulling or pushing force is applied, in the manner and for the purposes herein described.

76,162.—TUG BUCKLE.—George P. Cole, Hudson, Mich.

I claim the plate, A, as constructed in combination with a bolt, F, made adjustable as described, substantially as and for the purpose herein fully set forth.

76,163.—SLEIGH BELL.—Ezra G. Cone, East Hampton, Conn.

I claim the combination with the two open mouthed bells, A B, of one or more loose or detached "jingles," b, substantially as and for the purposes herein specified.

76,164.—GLOBE VALVE.—Wm. S. Cooper, Philadelphia, Pa.

I claim, 1st, The arrangement of the cap, C, valve, n, of the spindle, W, the washer, r, spring, K, central guide piece, G, and key P, with reference to the body, B, substantially as specified and described.

2d, The combination and arrangement of the central guide piece, G, valve, v, and tube, T, with the body, B, substantially as described and specified.

76,165.—LUBRICATING COMPOSITION.—Joseph Cordnan, Brooklyn, N. Y.

I claim, 1st, The use of asbestos, substantially as and for the purpose described; and

2d. The use of asbestos in combination with plumbago or other known lubricating substances, being mixed with a glutinous material, substantially as and for the purpose described.

76,166.—FLUID INDICATOR.—Joseph Cordnan (assignor to himself and R. W. Potter), Brooklyn, N. Y.

I claim, 1st, A screw composed of blades, of a spiral tapering form, in combination with a conical-shaped vessel or surface adapted to such screw, and a registering mechanism, substantially as and for the purpose herein described.

2d. The employment in the ends of the spindle of said screw, of horned recesses, substantially as and for the purpose described.

3d, The arrangement of the registering mechanism around the spindle of the screw, and within the body of the indicator, substantially as and for the purpose described.

4th, The construction of the registering mechanism substantially as described, so as to form an endless screw throughout, and thereby overcome friction and increase the facility of the indicator to register.

5th, The arrangement of gauze wire work within the induction aperture, substantially as described, in order to prevent substances from passing into the indicator.

6th, The arrangement of gauze wire work within the eduction aperture, so as to destroy the circular motion that the fluid receives in passing through the indicator.

76,167.—MANUFACTURE OF CHEESE.—Wm. S. Cornell, New York city,

I claim, 1st, In the manufacture of cheese, concentrating the milk by evaporation preparatory to introduction of the rennet, or substitute therefor, substantially as specified.

2d, The formation in vacuo of the curd from which the cheese is made, essentially as herein set forth.

3d, In the manufacture of cheese, retaining the butter usually lost in the whey, by evaporating the latter from the curd, substantially as specified.

76,168.—SAP BUCKET.—J. W. Currier, Newbury, Vt.

I claim the cover, C, provided with a bridge or support, D, and springs, E, for attachment to a bucket, all arranged, combined, and operating substantially as shown and described, for the purpose set forth.

76,169.—BOX OR CASE FOR SCALE BEAMS.—Augustus B. Davis, Philadelphia, Pa.

I claim, 1st, A box or case constructed substantially as described, in combination with a scale beam contained within the box, and having one or more sliding bars, which can be drawn through a slot in the box to an extent limited by a stop on the said bar or bars, as set forth.

2d, The within described box having two doors, one on each side, in combination with a scale beam graduated on both sides, as set forth, for the purpose specified.

76,170.—WINDOW SHUTTER HOLDER.—Charles R. Doane, Willamsburg, N. Y.

I claim the tastener, C, applied between the parts of the shutter hinge so as to vibrate on the pivot thereof, and constructed so as to operate substantially as herein described.

76,171.—BORING MACHINE.—Hugh Dool and Philo B. White, Dowagiac, Mich.

I claim the adjustable shaft, K, provided with the wheels, E and F, of different diameters, in combination with the horizontal shaft, B, provided with an adjustable wheel, D, when constructed and used substantially as and for the purpose specified.

76,172.—DITCHING MACHINE.—Alex. C. Decker, Bushnell, Ill.

I claim, 1st, The shovel, D, constructed as described, with cutting edge, d d1, arms, d6, and shoe, d2, in combination with clevis, R, rod, r, chains, d4, rollers, d3 d5, levers, u u1, and racks, u2 u3, substantially as described.

2d, The frame, A, constructed as described, frame, B, buckets, M, wheels, K, and roller, L, when combined and arranged as and for the purpose set forth.

3d, The shaft, F, shaft, G, shaft, H, wheel, I, with driving shaft and spur wheels, when combined and operated in the manner set forth.

76,173.—EXPLOSIVE POWDER.—G. Designoble and John Casthelaz, France.

We claim the application and use, substantially as described, of picrate or carbazote of potassa, as well as the salts formed from picric or carbazotic acid, and also the derivatives from such acid, and the acid itself, in and to the manufacture of powder, under the reservations set forth.

76,174.—ROTATING FAN.—I. S. Eastman, Madison, Wis.

I claim the combination of the rotating shaft, B, cylinders, C and C'', suspended from the ceiling above, and provided with arms, 1, 2, 3, so arranged as to be held at any adjusted hight by means of cord, E, and clasp, F, substantially as and for the purpose described.

76,175.—WARMING CARS ON RAILWAYS.—George W. Eddy, Waterford, N. Y.

I claim, 1st, The combination of the main pipe, P, for conveying a portion of the steam directly through the car, and auxiliary pipes, C, for conveying a portion of the steam around under each seat, and back into the main pipe, P, when said pipes are arranged substantially as described.

2d, The combination with the pipes, P and C, the check or valve, a, arranged substantially as and for the purpose set forth.

76,176.—MEDICAL COMPOUND.—M. C. Edey, New York city.

I claim the medicinal compound above described.

76,177.—BREWING BEER AND OTHER MALT LIQUORS.—Wm. H. Elliot, New York city.

I claim, 1st. Condensing the vapors of the boiling wort, and returning them to the boiling tank as fast as condensed, and afterward cooling the condensed vapors and the wort together by passing them through an inclosed surface cooler, as herein specified.

2d, The combination of an inclosed surface cooler with a boiling tank which is provided with a condenser for condensing the vapors of the wort, and with a pipe for conducting the condensed vapors back to the boiling tank as fast as condensed, as herein specified.

76,178.—APPARATUS FOR DYEING AND BLEACHING YARNS AND THREAD.—William H. Elliott, New York city, and Isaac Osgood, Utica, N. Y.

I claim, 1st, Grooves, flutes, or corrugations, i and i', for conducting dye and other liquids to the interior of a cop of yarn, when employed substantially as herein described.

2d, The grooved or fluted bobbin, d, when employed substantially as and for the purpose herein specified.

3d, Grooved or fluted skewer, g, when employed substantially as and for the purposes herein set forth

4th, The cup-shaped receivers, c, through which the liquids pass from the conducting pipes to the cops, substantially as specified.

5th, The combination of the receiver, c, with the bobbin, d, when the receiver is made to embrace a portion of the bobbin, substantially as and for the purpose herein specified.

6th, The combination of spring, n and n', with the upper receivers to adjust them to the length of the cop or bobbin, substantially as and for the purposes set forth.

7th, The follower, m, and spring, n, in combination with bobbin, d, substantially as and for the purposes specified.

8th, The combination of an upper adjustable receiver with a lower receiver, when constructed substantially as specified.

9th, The employment of a fluted or grooved skewer, in combination with a perforated cop tube or bobbin, substantially as described.

10th, The metallic bobbin or spool head, e, when struck up so as to form an inner and outer cylinder, in combination with corrugated or perforated body, d, substantially as specified.

11th, The combination of corrugations and perforations in the same body, substantially as and for the purpose specified.

12th, The employment of a skewer for supporting a bobbin, cop tube, or spool, in combination with the receivers, c, substantially as and for the purpose herein specified.

76,179.—DIRT SCRAPER.—Henry J. England, Delhi, N. Y.

I claim, 1st, The levers, d d', rods, e e', springs, g g', and catches, f f', in combination with a shovel dirt scraper, when constructed in the manner and for the purposes set forth.

2d, The projecting pieces, a a' and i i', in combination with a shovel dirt scraper, when constructed in the manner and for the purposes set forth.

76,180.—STEAM GENERATOR.—A. S. Foster, Indianapolis, Ind.

I claim, 1st, The arrangement of a flue boiler of sections, whereby the bridges of one section are opposite the flues of the adjacent section, substantially as set forth.

2d, The combination of all the several parts in one device, when constructed and used substantially as set forth.

76,181.—APPARATUS FOR COOLING LIQUIDS.—Harvey C. Fowler, Great Bend, Pa.

I claim my improved apparatus for cooling liquids, consisting substantially of a narrow refrigerating space, extending radially from and beneath an upper inlet aperture, and communicating with an outlet aperture, said space being inclosed between concentric or parallel walls surrounding a central coil air chamber, which communicates with an outer inclosing ice chest.

Also, the combination of diffusing flanges, s s, with the inner surface of the upper or lower walls of the refrigerating space, e, of my apparatus, substantially in the manner and for the purpose herein set forth.

76,182.—APPARATUS FOR GENERATING ILLUMINATING GAS.

George P. Ganster, New York city.

I claim, 1st, In an apparatus for generating gas from volatile hydrocarbons, the combination of the air forcing apparatus and carbureting apparatus, in the manner described and shown.

2d, Filling the compartments of the meter wheel with any suitable capillary material, for the purpose of enriching the air with the hydrocarbon with which the capillary material is saturated.

3d, A valve placed on the inlet pipe of the apparatus, so arranged as to close the opening when not in operation.

76,183.—THILL COUPLING.—G. H. Gardner, Philadelphia, Pa.

I claim the thill iron, C, having the eccentric head, F, and inclined slot, D, in combination with the clip, B, united by the bolt, e, and the rubber, E, all constructed and arranged as described.

76,184.—TRUSS.—John Glydon, New York city.

I claim, 1st, The combination of the rigid plate, g, slotted to receive the spring, with the spring, i, and the swinging pad, e, substantially as described.

2d, The arrangement and combination, in a truss for inguinal rupture, of two pads, e e, for the purpose of securing stability of position, with or without the supplementary protecting pad, f, substantially as described.

3d, Making the body spring or band of the truss, which incircles the body of a patient, in two independent parts, a a, connected and adjusted to each other, substantially as above described.

76,185.—CHURN.—E. T. Harlan, Star City, Ind.

I claim the combination of the winch and crank, the pitman, E, segment E', and pinion, G, for communicating both a vertical and rotary reciprocating action to the dasher, substantially as set forth.

76,186.—MODE OF PACKING NECKTIES.—William H. Hart, Jr., Philadelphia, Pa.

I claim, 1st, The holder, A, provided with the yielding tongues, a, for supporting and exhibiting the necktie or cravat, substantially as described.

2d, The combination, with a cravat holder or show card, of one or more bands, cords, or other fastenging, whereby the cravats may be securely retained in position without protruding through the card, substantially as described.

3d, The construction of the box body or frame, D, with ledges or supports, d; to adapt the show card or holder to be used as a bottom to the box, substantially as described.

76,187.—MEAT CHOPPER.—Nehemiah L. Hatch (assignor to himself and J. W. Gavett), Cape Elizabeth, Me.

I claim, 1st, The sliding frame, a, with crank, f, shaft, e, gears, g h, crank shaft, i, jointed driving rod, j, balance wheel, n, and handle, o, in combination with the railed tray, substantially as described.

2d, The sliding frame, a, with the shafts, e and i, crank, f, gears, h g, knife, l, and jointed rod, j, in conjunction with wheel, n, pawl, r, spring rod, s, pawl, t, ratchet, q, shaft, p, cord, u, and post, all in combination with the railed tray, as and for the purposes set forth.

76,188.—EARTH-BORING AUGER.—J. Wilson Heath, Memphis, Tenn.

I claim, 1st, The combination of the valve, a, with the slotted stem, b, pin, f, hollow shaft, s, and inlets, t t, all constructed, arranged and employed substantially as and for the purposes specified.

2d, The collar, g, when used in combination with a double spiral earth auger, as and for the purposes stated.

3d, The coupling, h i j j1 j2, constructed and arranged as described and for the purpose specified.

76,189.—STONE-DRILLING MACHINE.—Levi Hermance, Hudson, N. Y.

I claim, 1st, The arrangement of the slotted plates, n u, connecting bars, T T, and sleeve, J, in combination with the wheels, E E, having grooved pulleys, s s, on their inner faces, the whole arranged and operating substantially as specified.

2d, The combination of the frame, A, and its bolts, w w, with the plates, C C, having trunnion bearings, curved slots, D, and recesses, e e e, whereby the frame, A, may be placed at an angle with the frame, B, as specified.

76,190.—GATE.—Frederick M. Hickman, Rolling Prairie, Ind

I claim the combination of the hinges, C C, lever, D, and pulley, E, respectively, constructed and arranged substantially as set forth.

76,191.—SAW MILL.—H. D. Hinternesch, Baltimore, Md.

I claim bands or cords, S S', when combined directly with cranks or eccentrics upon a revolving shaft, K, and so arranged as to communicate therefrom a reciprocating movement to a scroll saw, A, substantially in the manner herein set forth.

76,192.—DUMPING WAGON.—John Holmes, Johnson, Vt.

I claim the arrangement of the levers, G, connections, F, and springs, A, with their offsets, C, when constructed, combined and operating as herein described and for the purpose set forth.

76,193.—TRUNK.—Calvin Horton, Somerville, Mass.

I claim a traveling trunk, the outer surface of the body of which is covered with strips of thin wood, the abutting edges of which strips are protected by the cleats or straps, substantially as described.

76,194.—MODE OF FILLING MARSHES.—George Howell, Philadelphia, Pa.

I claim, 1st, The combination and arrangement of the case, A, with a scow or boat by means of the vertical screw rods, N, wheels, o, pinions, o', and shafts, O O1 and O2, the said parts being arranged and operating substantially as described.

2d, The combination of the links, Y Y1 and Y2, with the case, A, and scow A', for giving a parallel motion to the former, substantially as described.

3d, The combination of the vertical rods, Z Z, with the case, A, and scow A', substantially as described.

4th, The geared shifting lever, Q, arranged and operating in relation to the driving shaft, K, and shaft, O1, substantially in the manner and for the purpose specified.

5th, The combination of the chains, T, pulleys, U, standards, V, and gripes, W, with the case, A, and scow, A', for holding the case in its altitudinal position, substantially as described.

6th, The combination of the coupling rods, M and M', with the case, A, and scow, A', substantially as described and for the purpose specified.

76,195.—GAS HEATER.—John S. Hull, Cincinnati, Ohio.

I claim a burner, supplied by the force of compressed air, in combination with a tinner's fire pot, for the purpose herein specified.

Also, the chambered gasifying and superheating disk, G, substantially as and for the purpose herein set forth.

Also, the screw cap, g, applied to the disk, G, substantially as and for the purpose specified.

Also, the enlarged passage, k, in the burner head, for the purpose set forth

Also, the screw plugs, l l m m, substantially as and for the purpose herein specified.

Also, the swell or dome, O, in the top of the heater, substantially as and for the purpose herein specified.

76,196.—PROCESSES AND APPARATUS FOR THE MANUFACTURE OF IRON AND STEEL.—Jacob Jameson, Philadelphia, Pa.

I claim, 1st, The reducing furnace, B, in combination with the chambers, D, and chimney flue, F, constructed and arranged for operation substantially as described and for the purposes set forth.

2d, The chamber, G, boiler, H, and pipes, h h', in combination with the reducing furnace, B, and chambers, D, constructed and arranged for operation substantially as described, for the manufacture or production of cast iron direct from the ore.

3d, Reducing the size and changing the form of the reducing furnace by blocks, M, arranging the chamber, G, for the production of large quantities of carbon, and introducing the carbon into the blast, and so into the reducing furnace, B, substantially as described, for the purpose of producing steel direct from the ore, as set forth.

4th, The process of treating ores, for the purpose of making cast iron or steel, in the manner and by the means substantially as herein described.

76,197.—BOLT CUTTER.—Jesse Johnson, West Fallowfield Townsbip, Pa.

I claim the compound tool herein described, consisting of the two levers, D D, working in a rack, B, with pinions; the steel knife, E, secured to the end of the rack, B, by screws or rivets, and made to slide in a slot or groove in the side of the frame, A, which keeps it in line; the stationary knife, F, made rounding on the back side, and secured in the end of the frame by a tenon; the two steel plates, C C, adjusted near the end of the levers; the set screw, G, which prevents the knives, E and F, from colliding, and on the end of which screw, G, there is a punch, constructed to work in a die on the opposite lever; the whole arranged, constructed and employed as shown in the annexed drawing.

76,198.—THILL COUPLING.—Phineas Jones, Newark, N. J.

I claim the combination of the metallic spring, b b1, formed upon the thill

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iron, the sleeve, E, and the tightening bolt, C, when arranged and employed substantially as and for the purpose herein set forth.

76,199.—MACHINE EOR ROLLING "COTS" ON DRAWING ROLLERS.—William C. Joslin, Putnam, Conn.

I claim the combination of the rollers, B C, feeding and delivering boards, J K, and roller. D, the latter having an intermittant motion to and from the others, all arranged for operation substantially as and for the purpose specified.

76,200.—POTATO DIGGER.—George W. Kintz, West Henrietta, N. Y.

I claim, 1st, The combination and arrangement of the revolving spiral tines, q q, and the angular teeth, o o', with the vibrating shaker, E, operating in the manner and for the purpose herein set forth.

2d, The angular vine puller, H, jointed at one end, employed in combination with the rod, I, having a free end movement, to discharge the vines, and a stay chain, u, which limits the back motion, the whole arranged and operating in the manner and for the purpose herein set forth.

3d, The construction and arrangement of the machine as a whole, consisting of the wheel. D, with cams, l l, vine puller, H, with rod, I, and chain, u, shakers, E E, with arms, m, share, G, with divider, r, and wings, s s, truck frame, B, with adjustable standard, b, and the skeleton beam. A, the whole operating as described.

76,201.—LOCK NUT.—Soloman W. Kirk, Coatesville, Pa.

I claim the within-described nut retainer, consisting of the concavo-convex ring, D, having a straight portion, y, adapted to a flat place on the stem of the bolt, and being arranged for fitting, and being jammed in the recess of a nut, all substantially as set forth.

76,202.—CHAIR AND LOUNGE.—George Knell, Moorestown, N. J.

I claim, 1st, The frames, A and B, in combination with the legs, l, the whole being arranged for adjustment, substantially as described.

2d, The combination of the above and a strap, q, or its equivalent, for the purpose of regulating the inclination of the several parts, as described.

3d, The frame, D, adapted to the frame, B, and adjustable thereon, substantially as and for the purpose set forth.

4th. The combination of the frame, B, and a sliding frame, C, substantially as and for the purpose described.

76,203.—HOT-AIR FURNACE.—Andrew Knobel, Monroe, Wis.

I claim, 1st, Providing the ash pit, a, and fire box, c, with lined openings, a' c", extending through the outer wall, substantially as specified.

2d, The suspended gas burner, e, constructed and operating substantially as specified.

3d, Constructing the furnace in cylindrical sections, so arranged that the middle sections, s" and t," may be removed or others added, without changing the other sections, substantially as specified.

4th, Supporting the chambered and flued portion of the furnace upon the pillars, m, and the combustion portion upon the pedestals, a," as described so that the combustion portion. a and c, may be removed or replaced without disturbing the heating portion.

5th, The small central chamber, f, located immediately above the gas burner, e, and fire box, c, for burning the unconsumed products of the fire below. and provided with side openings at the top, door, r, and conical inverted plate, o, substantially as specified.

6th, The combination and arrangement of the fire box, c, and gas burner, e. with the cylindrical sections, t' t" t"' t"" and s' s," divided and supported by the horizontal plates. x, x" x"' x"" substantially as and for the purposes specified.

76,204.—COAL STOVE.—Andrew Knobel, Monroe, Wis.

I claim, 1st, The combination of the vertical annular flues, f o', and the flue between the cylinders, l and k, with the horizontal flues, m' and t," and fire box, d, substantially as specified.

2d, The removable cap, f,' in combination with the pipe or flue, f, and register cap, r, so that all of the flues can be readily cleaned, substantially as specified.

3d, The open passage, e,' opening into the fire below the gas burner, in combination with the grated gas burner, e, fire box, d, and opening, d', substantially as and for the purposes specified.

76,205.—HOLLOW AUGER.—Frederick Kraus, Philadelphia, Pa.

I claim the rest, G, and bit stock, E, when said rest and stock are operated by a right and left screw, D. in the manner herein described.

76,206.—CHURN.—Peter C. Laub, Allentown, assignor to himself and Samuel Shaffer, Williamsport, Pa.

I claim the combination of the barrel-shaped churn, B, with its inner corresponding-shaped division, B, and chamber, G, when constructed, arranged, and operated as herein described and for the purposes set forth.

76,207.—HEEL CUTTING MACHINE.—Richard C. Lambert, Raynham, Mass., assignor to David Whittemore.

I clam, 1st, A heel cutting machine, having a swinging and sliding jack, constructed and operating substantially in the manner described.

2d, The combination and arrangement of the toothed segment, E, driven as described, the sliding journal block, F, and the jack frame, G, constructed and operating as specified.

3d, The mode described of jacking the shoe or boot by means of the screw, L, operated as described, which holds the heel against the pattern. H, and the jaw clamp, I I', which confines the toe, as set forth.

4th, The manner of automatically releasing and fixing the center of oscillation of the jack by means of the levers, Q, operated by the pins, b b', and raising and lowering the sliding stop, R, as specified.

5th, In combination with the knife stock, the guides, x y, one running in the rand of the shoe, and the other in contact with the edge of the pattern, H, as described.

6th, In combination with the swinging jack frame, the wheel, K, and screw, L, constructed, arranged, and operating as specified.

7th, In combination with the swinging and sliding jack, G, the guide ways, P, for guiding and steadying the horizontal and oscillating movements of the jack, as set forth.

8th, The combination of the lever, T, pivoted and operated as described, with the ways, W, of the knife stock, to give both horizontal and vertical movements to the knife, as specified.

9th, The toe clamp, I I', constructed, arranged and operating as described.

76,208.—PLOW.—John Lane, Chicago, Ill.

I claim the particular form and construction of the slip joint, as arranged, either with or without the flange, n, and either with or without the pin cutter, m, in combination with a lay and land side welded together, as described and for the purpose shown.

76,209.—STRAW CUTTER.—John Laughlin, Gettysburg, Pa.

I claim, 1st, The gates, C F, playing in grooves in the legs, B B, and provided with V-shaped knives, constructed as specified, and used in combination with the apron, P, lever. G, handle, J, and bar, K, all constructed and operating substantially as set forth.

2d, The bar, K, provided with a friction roller, and used with the handle and frame of a straw cutter for assisting in causing the edges of the knives to bind against each other or against a cutting plate, as is herein fully set forth.

76,210.—DIE FOR HEADING BOLTS.—William J. Lewis, Pittsburg, Pa.

I claim constructing the dies, B B, and header, A, as hereinbefore described, so that said dies will embrace four sides of the bolt head, and leave two openings for the two remaining sides, and space for the surplus iron, said dies and header being so arranged with relation to each other, that by turning the bolt one sixth way round, the surplus iron and the "flash" or "fin" will be brought in contact with a solid portion of said dies and headed, and thereby be driven into the head of the bolt, substantially as herein described and for the purpose set forth.

76,211.—TABLE WAITER.—John C. Libby, Biddeford, Me.

I claim the combination of the revolving zinc waiter, A, center revolving post, F, with its waiter, C, at top, and wire waiters, E E, projecting from each side of the center post, when constructed, arranged and operated as herein described and for the purposes set forth.

76,212.—BRIDGE.—Levi Liscom, Boston, Mass., assignor to himself, Rufus S. Merrill and William Lincoln.

I claim the combination, with the double lever, constructed as herein described, of truss work, united with the said lever by means of tie bolts or rods, as herein described, so that the said lever shall in effect constitute the bottom chord of the truss, substantially as set forth.

76,213.—SOAP.—George W. Love, Jackson county, Mo.

I claim the combination of the several parts, as above named, to be used in connection with soap, for the purpose set forth.

76,214.—SKATE.—Thomas Lovelidge and John Grindrod, Philadelphia, Pa.

We claim. 1st, A skate, having an elastic foot plate and two runners, arranged to move independently of each other in a vertical direction, but to guide each other laterally, all substantially as and for the purpose herein set forth.

2d, Securing a skate to a boot solely by studs on the skate, adapted to holes in plates on the sole and heel of the boot, substantially as described.

3d, The sole plate, A, and its runner, B, in combination with the heel plate, A', and runner, B', when the said plates and runners are rendered adjustable, to suit boots of different sizes, substantially in the manner described.

4th, The studs, n n', either fixed to or arranged to slide on the foot plate of the skate, near the toe, in combination with the plate, E, on the boot, and holes so formed and arranged therein as to admit and retain the said studs, substantially as specified.

5th, The stud, m, in conjunction with a plate, D, on the heel of the boot, the said plate having a hole of the character described, into which hole the head of the stud can be introduced and in which it can be secured, either by moving the plate to which the stud is attached backward, or by moving the stud itself in a slot in the plate, all substantially as specified.

76,215.—HAY RAKER AND LOADER.—Orrin Luce (assignor to himself and Martin Luce), Virgil, N. Y.

I claim, 1st, The eccentric bar, J, when supported as described, and operating in connection with the arms, m m m, the revolving bars, I I I, and the teeth, D D, substantially as and for the purposes set forth.

2d, The combination of the independent lever, d', with the rocking shaft, d, teeth, D D, gage, E, and spring, e, substantially as and for the purposes indicated.

76,216.—LINING BOOTS AND SHOES.—Timothy Lucey, and James E. Murphy, Salem, Mass.

We claim, in combination with a jack or plate, supported at its heel on a post or standard, an elastic or yielding surface for holding a cement-applied lining, to be applied to a shoe, substantially as set forth.

Also, combining the lining plate, e, with the jack, c, and its flanges, d, or the equivalents thereof, the plate being supported upon a rod, and being raised and lowered substantially as described.

76,217.—FEED-WATER HEATER FOR STEAM GENERATORS.—George W. Mack, Hamtramck, Mich.

I claim, 1st, The vales. H, and deflectors, I, in connection with the exhaust pipe. G, when operating substantially as and for the purposes described.

2d, The combination of the above-named parts with the heater, A, the connection pipes B and F, the chambers, C and E, the coil pipes, D, and the openings, J. when constructed, arranged, connected, and operating as and for the purposes herein set forth and shown.

76,218.—COMBINATION TOOL.—J. W. Marsh, Oxford, Mass.

I claim, 1st, The combination of the jaws, A B, provided with externally-grooved conical ends, F, with the springs, D, and set screws, E, the said parts being constructed and arranged as herein described, so as to constitute a combined drill holder and countersink.

2d, The combination with the jaws, A B, whose ends, F, are provided interiorly with notches, l, for receiving and holding the head of the screw of the springs, D. with or without set screws, E, by which the screw driver, placed between the jaws, is steadied and held, the said parts being constructed and arranged for operation as herein shown and set forth.

76,219.—METHOD OF CREATING DRAFT IN CHIMNEYS BY MEANS OF STEAM.—William H. Martin, Brooklyn, N. Y.

I claim, in combination with a smoke stack or chimney, the blast head, a, constructed substantially as described, so as to deliver the steam in said stack in a circular volume or volumes, substantially as set forth.

76,220.—MACHINE FOR THREADING SCREW CAPS.—John L. Mason, New York city.

I claim the arrangement of one or more roller dies, e, secured and made adjustable in a disk or face plate, C, in combination with the screw chuck, D, and longitudinally sliding mandrel, E, substantially as and for the purpose shown and described.

76,221.—MOLD FOR ARTIFICIAL TEETH.—John A. McClelland, Louisville, Ky.

I claim, 1st, A dental plate mold, formed in sections within a metal flask, substantially as described.

2d, A metal clamp flask, A, for said sectional dental plate mold, constructed and operating substantially as herein described.

3d. The method of forming a dental plate of plastic material, within the said sectional mold, substantially as herein described.

76,222.—GAS FIXTURE.—Emory McClintock, New Brunswick, N. J.

I claim, as a new article of manufacture, a revolving gas bracket for illuminating gas, constructed as described, in such a manner that when the bracket stands in one or more particular positions, the gas will flow through it, but when turned in all other positions the flow of gas will be cut off, as herein shown and described.

76,223.—TREATING CINDER FOR FIXING FURNACES.—Hugh McDonald, Allegheny, Pa.

I claim subjecting melted cinder, slag, dross, or recrement of iron, and of furnaces used in the manufacture of iron and steel, to an active current of air, substantially as herein described, and for the purpose set forth.

76,224.—DOOR AND PACKAGE HOLDER.—John K. McDonald, Newark, N. J.

I claim the combination of the piece, B, hooks, D E, and G, with the loop, A, substantially as and for the purpose specified.

76,225.—COMPOUND FOR MAKING PICTURES TRANSPARENT.—S. D. McPherson, Normal, Ill.

I claim the within-described ingredients, compounded and used substantially as and for the purpose set forth.

76,226.—MACHINE FOR DRESSING CHAIR SEATS.—Henry Meyer, Grafton, Wis.

I claim the guides, E F, the latter provided with the concave upper edge, whereby, as the carriage, G, is reciprocated, a rising and falling motion is imparted to it, by which the depression in the chair seat is cut, all arranged and operating as described.

76,227.—WOOD PAVEMENT.—Alexander Miller, and Carlile Mason, Chicago, Ill.

We claim a pavement, constructed of wedge-shaped blocks, A, when laid so as to break joints with those on the opposite rows, in combination with a concrete filling, and in further combination with a continuous wood foundation, and so laid as to form continuous rows across the street.

76,228.—ATTACHING CROSS CUT SAWS TO THEIR HANDLES.—Warren P. Miller, New York city.

I claim the collars, c c, pins, d, fitting in notches in saw, and the eccentrics, e e, when constructed, applied, and operating for the purposes as shown and described.

76,229.—PAINT CAN.—David Miller, Allegheny city, Pa.

I claim the combination of the flange, x, and male screw threads, x2, at the mouth of the body of the can, when used in connection with the female screw threads in the flange of the lid, substantially as herein described and for the purpose set forth.

76,230.—PAINT BRUSH.—Joseph W. Moore, Cambridgeport, Mass.

I claim the removable screw top, a, and the handle, C, with a screw thread b, in combination with wedge, B, with its shoulder, c, all constructed and operating substantially and for the purpose described.

76,231.—CULINARY APPARATUS.—Francis Morandi, Malden, Mass.

I claim providing a compound steam-cooking apparatus, such as described with water joints and return tubes, substantially in the manner and for the purpose specified.

76,232.—SHELF BRACKET.—Edward S. Morse, Salem, Mass., assignor to himself and Aaron Goldthwaite, Jr.

I claim, 1st, The method herein described of supporting shelves upon removable brackets, constructed and operating as and for the purpose described.

2d, The combination and arrangement of the bracket, D, upright, C, recess r, and pin, d, in the manner and for the purpose specified.

3d, The combination of the bracket, D, eye, e, and upright, E, in the manner and for the purpose set forth.

76,233.—GLUE CAN.—William Freeman Muchmore, Astoria, N. Y.

I claim a glue can, consisting of the water can, A, from the annular cover, B, of which the glue reservoir, C, is suspended, substantially as herein shown and described.

76,234.—LACING DEVICE.—James Nealey, Jr., Bangor, Me.

I claim, 1st, The hook, B, as a new article of manufacture. when constructed with in turning eyes, and the lacing eye closed, substantially as described and shown.

2d, Combining with shoe, C, the lacing hooks, B, when constructed and combined with the shoe, substantially as described and shown.

76,235.—HOE SEED-DROPPER.—Thomas Nevison, Jr., Morgan Ohio.

I claim the sack, I, chamber, D, attached to the hoe handle, A, in combination with the sleeve, E, gage block, F, brush. G, and spring, f, substantially as and for the purpose set forth.

76,236.—MACHINE FOR SHARPENING AND GUMMING SAW.—Abner W. Newhall, Horse Heads, N. Y.

I claim a table for supporting saws in being ground and gummed, constructed with two folding leaves, D D, so adjustably supported by the bifurcated support, E, as to maintain equal angles to the horizontal plane, substantially as and for the purpose set forth.

76,237.—DITCHING MACHINE.—W. A. Nichols, West Liberty, Iowa.

I claim, 1st, The ditching machine, consisting of the forward plow, C, attached to the beam, B, the cutting disks. D1, in front of said plow, in line with its point, the rear plow, C', having cutters. a, and secured to the beam, E, bearing the cutting disk, D2, and attached to the forward beam by the clevis and link, all constructed and arranged to operate as herein shown and described.

2d, The rear plow, C', when provided with the vertical cutters, a, for shaping the sides of the ditch, as herein shown and described.

3d, The arrangement of the forward cutting disks, D D1, with relation to the forward plow, C, as described, whereby the earth at the sides and center of the ditch is cut, to enable the plow to throw the dirt equally upon each side, as herein set forth.

76,238.—BAND FOR BALING COTTON.—Henry W. Oliver, Jr., Pittsburg, Pa.

I claim the band, A, bent around the head of the bolt, B, as indicated at x, said band being used in combination with the bolt, B, and nut, C, constructed, arranged, and operating substantially as herein described, and for the purpose set forth.

76,239.—LAMP CHIMNEY.—William Onions, and Henry Roberts, St. Louis, Mo.

We claim the elastic band, C, attached to the lower part of the upper metallic portion, B, of the lamp chimney, and extending down below the same, to fit into the upper end of the glass portion, A, of the chimney, substantially in the manner as and for the purpose set forth.

76,240.—HOISTING APPARATUS.—Charles R. Otis, Yonkers, N. Y. Antenated March 25, 1868.

I claim, 1st, So combining the drum, B, with the steam valve and friction brake, that when released from the tension of the suspending rope, it shall automatically cut off the steam from the engine, and tighten the brake against the wheel, substantially as herein set forth.

2d, The studs, f f*, and spring, g, in combination with the band wheel, a, and drum, B, whereby the drum is moved in advance of the band wheel when released from the tension of the suspending rope, substantially as herein set forth.

3d, The cam-faced annular slide, a*, furnished with an arm, d, connected with the drum, B, in combination with the cam-faced enlargement, b, of the shaft, A, and the sliding rod, c, whereby the turning of the aforesaid slide is caused to operate the valve in the supply pipe, A*, substantially as herein set forth.

4th, The rod, m*, and lever, m, so combined with the valve in the supply pipe, A*, and the loaded lever, D, of the friction brake, that the said brake shall be held away from the friction wheel, b, when the valve is opened, substantially as herein set forth.

76,241.—WHEEL-BARROW.—Francis Parkerson, Philadelphia, Pa.

I claim a wheel-barrow, composed of the above-described parts, all arranged, constructed, and operating in the manner above set forth and shown.

76,242.—ROCK DRILL.—Joseph Peevy, Orono, Me.

I claim, 1st. The adjustable and notched collars, n n', in combination with the drill shank, m, and the bifurcated and notched shaft, k, as and for the purpose set forth.

2d, The spring arm, k, in combination with the walking beam, A, and the drill rod, as and for the purpose set forth.

76,243.—PLOW.—Mathias Penning, Leavenworth city, Kansas.

I claim the combination and arrangement of the colter, A. having a horizontal extension, B, bolted to the land side, the rod. E. eye bolt, n, eye plate, e, clip, b, upright, d, plow handle, G, and plow beam, H. all constructed and operating substantially as and for the purpose shown and described.

76,244.—COMPOUND FABRIC FOR COVERING WALLS, ETC.—John M. Perkins, Plainfield, N. J.

I claim, 1st, A compound fabric, composed either of laminæ of wood and paper, or laminæ of wood and paper pulp, or laminæ of wood and some textile material, for covering and decorating walls or furniture, prepared, employed, and preserved from injury while being handled or transported, in the manner and for the purpose herein set forth.

2d, Preserving thin laminæ of wood, or any compound thereof, from liability to injury, and securing ease and freedom in unrolling the same, by forming the rolls in such a manner that the grain of the wood shall run in the direction of and around the roll, substantially as described.

76,245.—VARNISH FOR THE SURFACE OF ROLLS USED IN TEXTILE MACHINERY.—David Pheteplace, Lewiston. Maine.

I claim the described compound, consisting of the ingredients, substantially as set forth.

76,246.—CLAMP FOR HOLDING PALM-LEAF WARP.—Cyrus Powers, Greenwich Village, Mass.

I claim the removable clamp for holding palm-leaf warp, constructed as described, consisting of the grooved piece, B, and tongued piece, A. hinged together at a, and provided with the notches and catches, c, as herein shown and described.

76,247.—NUT-CRACKER.—E. L. Pratt, Boston, Mass.

I claim, in combination with jointed jaws, a b, the lever. d, jointed to one jaw, b, and hung upon a swinging fulcrum, substantially as described.

Also, connecting the lever to the jaw. a, by the curved link or links, e substantially as and for the purpose set forth.

76,248.—LIMB AND BASKET HOLDER.—Wm. Richardson, Baltimore, Md.

I claim the instrument above described, consisting of the staff, A, fixed hook, H, sliding hook, H, and the knob, a, or its equivalent, all the parts being constructed and arranged substantially in the manner and for the purpose specified.

76,249.—WAGON WHEEL.—P. R. Ridgely, Iron Mountain, Mo.

I claim the rib, b, when combined with the spoke, B, and felly, C, in the manner herein shown and for the purpose set forth.

76,250.—SHINGLE MACHINE.—Daniel W. Roche (assignor to himself and J. P. Roche), Rochester, N. Y. Antedated Feb. 25, 1868.

I claim the screw, l, revolving nut, n, and hand-wheel, o, geared to said nut, all arranged and operating in connection with the movements of the carriage, substantially as and for the purpose herein specified.

76,251.—GATE—Elias Roth, New Oxford, Pa.

I claim, 1st, The combination of the pivoted lever, E, and connecting-rod or bar, G, with the gate, A, substantially as herein shown and described, for the purpose of opening and closing the gate.

2d, The combination of the rope, H, swiveled pulley, I, two or more ropes or wires, K, and pivoted pulleys, L. with each other and with the lever, E, and posts, F and M, or equivalent supports, substantially as herein shown and described, and for the purpose set forth.

76,252.—CURTAIN FIXTURE.—Lewis J. Schaefer, Philadelphia, Pa.

I claim the combination of the rod, C, with its projections, a a', or their equivalent, and the spring, D, so arranged that the adjustment of the fixture is effected by turning the said projections between the coils of the spring, substantially as herein specified.

76,253.—MIRROR.—Samuel R. Scottron, Springfield, Mass.

I claim, 1st, An arrangement of mirrors, b c, in frames, d e f, and set into wings, C and D, hinged together, substantially as and for the purpose shown.

2d. The combination of the above with the rod, B, having the shoulder, a, and set-nut, E, and arranged in a stand, A, so as to be adjustable in hight, substantially as shown.

76,254.—ANIMAL TETHER.—Jonathan Scribner, Franklin, N. H.

I claim the forked and curved pole, C, with weights, D, in combination with cross-bar, B, and standard, A, substantially as described.

76,255.—HARVESTER.—Antony Shebanck, Cleveland, O.

I claim, 1st, The drum, K, placed loosely on the axle, C, and provided with the internal teeth, j. the pinion. L, connected with the fixed plate. M, and the pinion, N, attached to the bevel-wheel, H, placed loosely on the axle, C, all arranged in connection with the clutch, O. for the purpose of driving or operating the sickle, Y, substantially as and for the purpose set forth.

2d. The collar, c, provided with the circular disks, D, having two flanges d d. in combination with the right-angular flanged hub, e, and pawls, F F, whose guide-rods, g, surrounded by spiral springs, operate upon each side of the axle, C, all constructed, arranged, and operating as herein described for the purpose specified.

3d, The rod, T, applied to the finger-bar, P, and rod, S, as shown, and connected with the bent lever, U, arranged relatively with the lever, V. to operate in the manner substantially as and for the purpose set forth,

76,256.—PROCESS FOR STEELIFYING IRON.—Thomas Shehan, Dunkirk, N. Y.

I claim, 1st, The combination of the ingredients composing the charcoal compound, substantially as and for the purpose set forth.

2d, The combination of the charcoal compound with the broken limestone, substantially as and for the purpose described.

3d, The employment of a perforated plate, when used as and for the purpose specified.

76,257.—SALIVA PUMP.—A. M. Shurtleff, Boston, Mass.

I claim combining with the saliva vessel or chamber, a device for attaching it to a chair or other surface, substantially as described.

Also, in combination with the vessel, a, and its flexible pipes and mouth-piece and pump-bulb, the let-off pipe, r, substantially as described.

Also, combining with pipes. s and b, and vessel, a, the reversible bulb. c, or reversible valves, for drawing the saliva into vessel, a, or for expelling it therefrom, substantially as set forth.

Also, covering an elastic pump bulb with a close woven or equivalent covering, substantially as shown and described.

76,258.—BEE HIVE.—A. J. Smith, and H. C. Reed, Decorah, Iowa.

We claim the combination of the queen trap and cage with the hive, substantially as described for the purpose specified.

76,259.—RUNNERS FOR UMBRELLAS.—O. M. Smith (assignor to S. W. Evans and A. Agnew), Philadelphia, Pa.

I claim a runner or notch, consisting of a tube, A, and a bent plate or ring, a', constructed and secured to the tube, substantially as described.

76,260.—MILK STIRRER.—J. H. Soule, Georgetown, N. Y.

I claim, 1st, The stirrer, I, constructed as described, resting upon the milk to be stirred, and operated by means of the arm, H, from the beam, A, having the weight, B, and bucket, C, said stirer being allowed to rise and fall with the milk in the vat. as herein shown and described.

2d, The combination of one or more buckets, C, and stop chain or chains, F, or their equivalents, with the pivoted beam. A, substantially as herein shown and described, and for the purpose set forth.

3d, The combination of one or more spring catches, G, with the end or ends of the pivoted beam, A substantially as herein shown and described and for the purpose set forth.

76,261.—WINDMILL.—A. H. Southwick, Oskaloosa, Iowa.

I claim the arrangement of the platforms, B C, and wheel. E, with the shutters, G G. connected together by the fastenings, q q, and rods. H H, and combined with a governor, substantially as and for the purposes set forth.

76,262.—HEEL PROTECTOR.—A. H. Southwick, Oskaloosa, Iowa.

I claim the metallic rim, d, for attaching to and around the entire under surface of the heel, when said rim is provided with the curved and beveled flange, A, to extend up the side of the heel and keep the same level, as and for the purposes described.

76,263.—FORMER FOR HOOP SKIRTS.—Alfred R. Stanley, Boston, Mass.

I claim combining the skirt former fram with its standard, by a turning and sliding join, and counterpoising mechanism, substantially as and for the purpose specified.

Also, in combination with the skirt former frame. the series of adjustable clamps, or equivalents therefor, substantially as and for the purpose specified.

76,264.—STEAM WATER ELEVATOR.—C. L. Stevens (assignor to himself and A. A. Denton), Galesburg, Ill.

I claim the construction of a wooden air-tight tank, strengthened and supported with the iron bolts, battens, and wooden casings, substantially in the manner and for the purpose as herein set forth.

76,265.—COMPOUND RUBBER ENAMELLED CLOTH FOR BOOTS AND SHOES.—Edgar M. Stevens, Chelsea, Mass., assignor to himself and W. N. Ely, Trustees.

I claim, 1st, The use of the compound rubber enamel cloth. as described, in the manufacture of boots and shoes.

2d, As articles of manufacture, boots and shoes made, as to their uppers, of the compound rubber enamel cloth, substantially as described.

76,266.—MODE OF TREATING MALT AND OTHER LIQUIDS.—G. Storey, Wheeling, W. Va. Antedated March 20, 1868.

I claim the process of treating malt liquors and the fermented extracts of cereals by freezing, substantially as herein described.

76,267.—ARTIFICIAL LEG.—A. Strasser, Montgomery, Ala.

I claim the combination of the frames, E F, hinged together with the stop joint, G, the sliding frame, H. having arms, I, engaging with the notches, O, of the frame, E, the cross bar, K. stem, J, spiral spring, N, strap, L, and adjustable eye-bolt, T, all constructed and arranged to operate as herein described for the purpose specified.

76,268.—PISTON.—Wager Swayne, United States Army.

I claim a piston, constructed substantially as described, so as to operate automatically during nearly the whole movement of the piston by its motor, to discharge water against the inner surface of the cylinder on the exhaust side of the piston, for the purposes specified.

76,269.—DROPPING PLATFORM FOR HARVESTERS.—C. R. Taber and J. Oscar Taber, Salem, Ohio.

We claim, 1st, A vibrating or swinging dropper composed of slats supported at their rear ends only, in combination with the ledge or rebate upon the finger bar, substantially as described.

2d, A slatted dropper suspended upon single vibrating arm at its inner end substantially as described.

3d, The combination of the vibrating dropper with the single standard or support of the overhung reel, substantially as described.

4th, The links or arms, e e, in which the reel shaft has its bearing. by means of which the reel is adjusted upon its single standard or support, as described.

76,270.—MACHINE FOR MAKING PAPER PULP.—J. Taggart, Roxbury, assignor to himself and J. A. Bacon, Bedford, Mass.

I claim the combination of the male and female cylinders or frusta, and the helical threads thereof, arranged on them so that that or those of one cylinder or frustum shall be pitched in a direction opposite to that or those of the other, as specified, the same being for use in manner and for the purpose substantially as hereinbefore set forth.

Also, the reducing cylinders or frusta. made with helical threads, arranged with opposite pitches, as described, and as having teeth formed on the upper part of either or each cylinder or frustum, as set forth.

Also, the application of the shaft of the inner of the two frusta, made as described, to the driving pinion and bearing of such shaft as to enable the frustum to rise within its fellow under circumstances substantially as set forth.

And, in combination with the reducing frusta, so made with helical threads arranged to pitch in opposite directions, as set forth, means. substantially as described, or its equivalent, for supporting the inner frustum, and adjusting it in altitude, as specified.

Also, the arrangement or combination of the two frusta, made, as described, with a tank or tub, substantially in manner as set forth, whereby the contents, reduced in a liquid, when in the tub, and the inner frustum may be in

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revolution, are made to flow radially and vertically with respect to the outer frustum, as specified, such causing the pulp, in passing into the reducing frustum, to converge toward a common center, and, in passing out of such frustum, to diverge from the frustum tangentially, or thereabouts, whereby the pulp will be mixed to great advantage.

76,271.—MANUFACTURE OF SPHERICAL SHOT AND SHELL.—John Blake Tarr, Fair Haven, Mass.

I claim, 1st, A combination of mechanical devices, substantially such and operating essentially so, as that hereinbefore described, for compressing and forming spherical shot, while in a plastic state from heat.

2d, In a machine such as is hereinbefore described, giving the outer edges of the retaining and forming dies an additional flare, in the manner and for the purpose above set forth.

3d, In combination with a pair of concave dies, arranged to compress or form spherical bodies of heated metal, as above described, mechanism for imparting to each of said dies a different motion from that given to the other substantially as and for the purpose above described.

4th, In a machine for forming spherical bodies from heated metal, in the manner above shown, the construction and use of a stop gage, constructed substantially as described, in combination with compressing and forming dies.

76,272.—MEDICAL COMPOUND.—C. K. Tayntor, Cuyler, N. Y.

I claim a medical compound, composed of the ingredients herein set forth and for the purposes described.

76,273.—CURTAIN FIXTURES FOR CARRIAGES, ETC.—Charles E. Thompson, New Haven, Conn.

I claim the combination of the metal socket, a, and india rubber tube, b, with the binding lever, c H, and the springs, d and B, when they are constructed, arranged and fitted for use, substantially as herein described and set forth.

76,274.—WATER METER OR MOTOR.—Chester Turner, Grand Rapids, Mich.

I claim, 1st, The pivoted wings, H H', adapted to operate both as valves and pistons, substantially as herein described and represented.

2d, The combination of the shell or casing, A B, packing, I, ports, F G, rotory hub, E, having chambers or apartments, E1 E1*, and openings, E2 E3, with the valves or wings, H H', all constructed and arranged to operate in the manner and for the purpose set forth.

76,275.—SUB-SOIL PLOW.—S. D. Tuttle, Eaton, Ohio.

I claim, 1st, The screw clip, C, furnished with the thumb screw, c, substantially as and for the purpose set forth.

2d, The screw clip, C, in combination with the subsoil attachment, S, substantially in the manner and for the purposes specified.

3d, The brace, T, in combination with said subsoil attachment, as and for the purpose described.

4th, The weeding attachment, E, substantially as and for the purpose set forth.

5th, The combination of the lever or rod, n, with the guide, N, as and for the purpose specified.

6th, The clip, C, subsoil attachment, S, brace, T, handles, B B, weeding attachment, E, rod or lever, n, and guide, N, the whole being constructed and arranged substantially in the manner and for the purpose set forth.

76,276.—ROOFING COMPOUND.—Wm. B. Valentine, Buffalo, N. Y.

I claim a roof composed of materials combined and applied in the manner herein described.

76,277.—COCK FOR GAS BURNER.—Samuel B. H. Vance (assignor to Mitchell, Vance and Co.), New York city.

I claim the gas burner cock having the round edge port or passage, c, constructed around about two thirds of the circumference of the plug, substantially as shown and described, and for the purpose specified.

76,278.—AUGER.—A. C. Vaughan, Philadelphia, Pa.

I claim the metal tube, A, with its external screw thread, b, extending to the lower end of the tube, when the latter, with the screw thread, is cut away, to form the cutting edges, i i i2, and when the outer edge of the screw thread is on a line with or nearly on a line with the outer cutting edge, i, for the purpose described.

76,279.—PORTABLE ROCK DRILLING MACHINE.—Wm. Weiler, Washington, N. J.

I claim, 1st, The drill rod, L, operated by a sliding weight, H, and raised and partially turned between each of the blows of the weight by the anti-fraction rollers, f, and dogs, g, of the endless bands, d and d', through the medium of the levers and devices herein described, or their equivalents, all substantially as and for the purpose specified.

2d, The drill rod, L, secured to the frame of the machine by plates, k and l, in such a manner as to be readily detached from the same, as described.

3d, The sliding weight, H, and its spring catch, I, elevated by the plates, e, of the endless bands, d and d', and released by the pin, j', of the adjustable plate, k, in the manner and for the purpose specified.

76,280.—STEAM BOILER FURNACE.—James D. Whelpley and Jacob J. Storer, Boston, Mass.

I claim, 1st, The inclined jambs, m, and fire brick arch, I, arranged within the fire box, to secure an axial focus of radiation within the fire box, substantially as described.

2d, The arrangement of inclined jambs in the fire box, and concave radiating flue beneath the boiler, to utilize the heat of radiation more perfectly, substantially as described.

3d, The arrangement of the surrounding masonry flues of the setting surrounding the boiler, with concave interior surfaces towards the boiler, so curved that the axis of the radiation may fall within the water space of the boiler as a linear focus, as and for the purpose described.

4th, In the employment of pulverized fuel for heating purposes, the arrangement of a blast of carbon and air above the fire, introducing the air-floated coal among radiating surfaces, together with a blast of less power below the grate bars, to maintain the combustion of the lump coal, and prevent fusing the grate bars, as and for the purpose described.

76,281.—WASHING MACHINE.—Levi H. Whitney, Washington, D. C.

I claim a washing machine combining in its construction the following elements, viz: A boiler, A, and steampipe, D, a case, E, with perforated partitions, F and G, an oscillating frame, M, with arms, M', said frame being attached diagonally to the shaft, L, and receiving motion from the arm, I', and bevel wheels, l and K, and the balls, N, said several parts being arranged substantially as described.

76,282.—CORN PLANTER.—Thomas H. Wible, Quincy, Ill.

I claim a hand planter, constructed and arranged substantially in the manner described, so as to deposit four grains of corn or other seed in one hill, each in a separate hole, and at fixed distances from each other, by one positive motion, as herein specified.

76,283.—PLOW CARRIAGE.—Geo. F. Willey, Laconja, N. H.

I claim the construction of the carriage, A A A, with the plow, P, and attachments, combined and adjusted as shown in the drawings.

76,284.—GILL NET.—Daniel Wills, Camden, N. J.

I claim the application of a series of open frames or rings to the meshes of the bottom of the net, substantially as described for the purpose specified.

76,285.—REFRIGERATING CAR.—Geo. K. Wood, Morristown, N. J.

I claim the pillar, Hx, arranged or placed within the provision chamber, any or all of them communicating above and below the dead air space, between said chambers and the sides of the car, substantially as and for the purpose set forth.

76,286.—PACKING FOR JOINTS.—J. E. Wootten, Reading, Pa.

I claim a packing compound of felt or other suitable fibrous material, prepared in the manner and for the purpose specified.

76,287.—PAPER FILE.—Edmund W. Woodruff and George C. Green, Washington, D. C.

We claim, 1st, The clamp lever, D, provided with the lugs, F F G G, or their equivalents, combined with the base board, A, substantially as described, so that no portion of said clamping device shall project below the lower surface of said base board when the apparatus is in operative condition.

2d, The clamp lever, D, or its equivalent, and the file board, E, combined and arranged so that the pressure derived from the elasticity of the paper shall always be applied to the upper end of said lever, substantially as set forth and to the effect described.

3d, Making the file board, E, or its equivalent, separate from and independent of the clamping device, for the purpose set forth.

4th, The plate, C, or its equivalent, extending lengthwise through the central portion, but not to the edges of the base board, A, substantially as described, in combination with the clamping device, so that the side pieces, B B, may be applied without interfering with the operation of said clamping device.

76,288.—SCUFFLE HOE AND GARDEN TRIMMER.—Isaac Pardee (assignor to himself and Arial C. Cotton), Vineland, N. J.

I claim the combination of the angular plate, A, arms, B B, and piece, C, substantially as shown and described and for the purpose specified, and that whether with the slot, e, or a series of holes as described, in its stead, and whether with or without the radial serrations mentioned.

76,289.—ANIMAL TRAP.—William L. Starr, Columbus, Ohio.

I claim the substitution, in a box trap, A, of a single wire coil, E, retained by a yielding connection, a, and having its two ends free and pointing inward, one to hold and release the revolving platform, and the other for the bait, in place of the ordinary pivoted lever, and all operating together substantially as herein described.

76,290.—FARE BOX FOR PASSENGER CARS.—James E. Woodruff, Buffalo, N. Y.

I claim a box to receive passenger fare, in combination with a revolving cylinder, or its equivalent, under control of the driver, to act as a cover to said box, so that the fares may be put in without any opening of the box.

76,291.—HOOP SKIRT.—Alfred R. Stanley, Boston, Mass.

I claim the method of manufacturing hoop skirts herein described, that is to say, uniting the ends of the wires by means of the lock clasps herein described, and inclosing said clasps in the pockets of the tapes, or equivalent covering, all while on the "former," substantially as set forth.

Also, as a new manufacture, a hoop skirt with the ends of the wires united together by the lock clasps herein described, and said clasps inclosed in the pockets of the tapes, or the equivalent thereof, all substantially as herein described.

76,292.—COOKING STOVE TANK.—Gurdon G. Wolfe, Troy, N. Y.

I claim, 1st, The reservoir or water tank, A, constructed with an upper bottom, F', and a lower bottom, A', and intermediate plate, K, and exit flue, E, each being arranged and combined in the manner and for the purposes substantially as herein described and set forth.

2d, The combination of the reservoir or water tank, A, constructed substantially as herein described, with a cooking stove, having a part or portion of the rear end of the top removed, substantially as shown at fig. 2 of the accompanying drawings, so as to receive and contain the upper part or bottom, F', of said reservoir, in the manner and for the purposes substantially as herein described and set forth.

3d, The employment of the damper, C', in the upper part of the rear and vertical end plate of the cooking stove, in combination with the vertical flues in the rear end of the stove, and with that part or portion of said reservoir extending below the top plate of said cooking stove, as seen at fig. 1 of accompanying drawings, and in the manner and for the purposes substantially as herein described and set forth.

4th, The employment of the flue-opening, L, flue-plate, L', and flue chamber, M, in combination with the reservoir, A, in the manner substantially as herein described and set forth.

5th, The employment and arrangement of a reservoir or water tank with a cooking stove, so that a part thereof shall be above the top plate of the stove, and over the vertical flue or flues in the rear end thereof, and a part below such top plate, in the manner substantially as shown at fig. 1 of the accompanying drawings.

76,293.—MANUFACTURE OF HARD RUBBER.—William Mullee, Chesterville, assignor to Mosely Ezekiel, Philadelphia, Pa.

I claim the above-described process of producing a prime article of hard rubber, by combining rubber and sulphur, as above described, and treating them substantially in the manner above set forth.

## REISSUES.

2,903.—DUSTING BRUSH.—J. O. Adams, and E. A. Warfield (assignees of Robert H. Aldrich,) Northampton, Mass. Patented March 12, 1867.

We claim a brush made of sheep skin, with the wool on, cut into strips, and fastened over one or more central cores, substantially as herein shown.

2,904.—MACHINE FOR ROLLING, SHAPING, AND FORGING FILE BLANKS, FILERS, AND OTHER METALLIC ARTICLES OF SMALL DIMENSIONS.—David Blake, Waterford, N. Y., assignee of James Dodge. Patented May 1, 1866.

I claim, 1st, The combination of a rolling apparatus, having an intermittent movement, in combination with a swaging apparatus, all constructed substantially as described, and so used alternately that a piece of metal will, as the mean effect of the rolling and swaging operations, be fashioned into shape substantially in the manner hereinbefore set forth.

2d, Governing the rotation of the rollers, so as to stop and start such rotation at any desired time or position, by the means described, or by other mechanical equivalents.

3d, The combination and use of the wedges and springs, constructed and arranged as described, for regulating the distance of the rollers.

2,905.—HARVESTER.—John A. Dodge, Auburn, N. Y. Patented June 26, 1866.

I claim, 1st, The frame, A, attached to the platform, and arranged to support the rake and beater arms, substantially as set forth.

2d, The combination, substantially as set forth, of a continuously revolving crown wheel, carrying rake and reel arms, with the frame or standard, A, for the purpose described.

3d, The combination of the cam, B', and bed piece, B, with the frame, A, these parts being constructed and arranged for joint operation as set forth.

4th, Pivoting the rake and reel arms to the crown wheel, L, by means of the cross heads or bars, b, fitting into suitable cavities in the wheel, L, and held in place by the plate, O, substantially as shown and described.

5th, The combination, substantially as set forth, of the detent plate, E, and ratchet plate, E', with the sprocket wheel, D, chain, M, and pulley, C, for the purpose set forth.

6th, The combination, substantially as described, of the bracket, I, socket, I', and overhanging arm, H, for the purpose set forth.

7th, The combination, substantially as described, with the overhanging arm, H, of the chain, P, and arm, G, to support the inner end of the platform.

2,906.—MECHANISM FOR BOOT AND SHOE SEWING-MACHINE.—W. N. Ely, Stratford, Conn., assignee by mesne assignments, of Francis D. Ballou. Patented January 22, 1861.

I claim, 1st, The foot piece, C, when constructed and arranged and used as a guard, or guard and gage, substantially as and for the purposes described.

2d, The lip or standard, c, when constructed, arranged, and used as a guard or gage, or support for the shoe, substantially as described.

3d, The combination of a guide or guard, substantially as described, with an opener for opening the channel for the action of the needle, substantially as set forth.

4th, The presser, D, in combination with the adjustable foot pieces, C and C', substantially as described.

5th, The bearing plate, B, and lip or standard, c, in combination with the presser bar, substantially as described.

6th, The projecting perpendicular plate, B, with standard, c, substantially as and for the purposes described.

7th, The combination of the bearing plate or table, E, with the lip or standard, c, substantially as described.

8th, The combination of the standard, c, with the foot piece, C, arranged substantially as described, and for the purposes set forth.

9th, The supporting, guarding, or guiding, and channel opening mechanism, when combined and arranged in relation to each other, substantially as and for the purposes set forth.

10th, The projecting horizontal table plate, A, provided at its outer edge with a projecting standard, c, and arranged so that an opening is formed between the two for the needle, substantially as and for the purposes described.

2,907.—WATCH.—S. D. Engle, Hazleton, Pa. Patented April, 24, 1866.

I claim, 1st, The employment of a box or supplemental case, B, to receive the movement of a watch, secured in the external or principal case of the watch, by means of studs or pins and a groove, for the purpose herein set forth.

2d, The cup, h, with its flange, b2, and washer, i, arranged with the keyhole g, in the manner and for the purpose herein described.

2,908.—EYE-GLASS.—Charles Parker, Meriden, Conn., assignee of George N. Cummings, Providence, R. I. Patented July 30, 1867.

I claim, 1st, The continuous spring, B, combined with the two glasses, A A, when attached and secured to each of the bows, at or near the point, D, in the manner substantially as herein set forth.

2d, The arrangement of the guides, E E, upon each of the bows, and so as to wholly or partially surround the spring, at a point above the point, D, and and so as to leave the spring free in the said guides, substantially as and for the purpose specified.

2,909.—CULTIVATOR.—John S. Rowell, and Ira Rowell, Beaver Dam, Wis. Patented July 3, 1866.

We claim the combination of the slotted beam, A, shank, B, brace bar, C, and bolt, D, when the parts are constructed and arranged to operate as and for the purposes herein specified.

## DESIGNS.

2,961.—TOBACCO BOX.—George M. Bull, New Baltimore, N. Y.

2,962.—CONTAINER OF WATER CLOSET.—William S. Carr, New York city.

2,963.—STOVE DOOR.—Daniel S. Colby, and Robert Scorer (assignors to Edward J. Hicks, and Gurdon G. Wolfe), Troy, N. Y.

2,964.—LEG AND DOOR OF A STOVE.—Daniel S. Colby, and Robert Scorer (assignors to Edward J. Hicks, and Gurdon G. Wolfe), Troy, N. Y.

2,965.—STOVE URN.—Daniel S. Colby, and Robert Scorer assignors to Edward J. Hicks, and Gurdon G. Wolfe), Troy, N. Y.

2,966.—KEY SOCKET.—Louis Hildebrand, Philadelphia, Pa.

2,967.—TRADE MARK.—Joseph C. Hoagland, Ft. Wayne, Ind.

2,968.—CLOCK FRONT.—Elias Ingraham, Bristol, Conn.

2,969.—CLOCK CASE FRONT.—Elias Ingraham, Bristol, Conn.

2,970.—STOVE.—Frederick Leibrandt, and William L. Mcdowell, Philadelphia, Pa.

2,971.—COOK'S STOVE.—John Martino, Jacob Beesley, and John Currie, Philadelphia, Pa. Antedated February 11, 1868.

2,972.—TRADE MARK.—Sylvester S. Marvin, Pittsburg, Pa.

2,973.—FURNACE DOOR.—A. H. Mershon, Philadelphia, Pa.

2,974 and 2,975.—FLOOR CLOTH PATTERN.—Charles T. Myer, Bergen, N. J., assignor to Edward C. Sampson.

2,976.—CLOCK CASE FRONT.—Carl Muller, New York city.

2,977 and 2,978.—CLOCK CASE FRONT.—George B. Owen, Winsted, Conn.

2,979 and 2,980.—ALPHABET OF LETTERS.—William H. Page, Norwich, Conn., assignor to W. H. Page & Co.

2,981 and 2,982.—PRINTER'S BORDER.—Wm. H. Page, Norwich, Conn., assignor to W. H. Page & Co.

2,983.—GROUP OF FIGURES.—John Rogers, New York city.

2,984.—DOOR OF A STOVE.—John R. Rose, and Edward C. Calely (assignors to Cox, Whiteman & Cox), Philadelphia, Pa.

2,985.—COOK'S STOVE.—Garrettson Smith, and Henry Brown assignors to William Flesh and J. J. Roeper), Philadelphia, Pa.

2,986.—COOK'S STOVE.—Garrettson Smith, and Henry Brown (assignors to Smith, Johnson & Co.), Philadelphia, Pa. Antedated Feb. 25, 1868.

2,987.—SHOW CASE MOLDING.—Philip Sum, New York city.

2,988.—PLATE OF A STOVE.—Nicholas S. Vedder (assignor to Edward J. Hicks, and Gurdon G. Wolfe), Troy, N. Y.

2,989.—DOOR AND LEG OF A COOK'S STOVE.—Nicholas S. Vedder (assignor to Edward J. Hicks, and Gurdon G. Wolfe), Troy, N. Y.

2,990.—COOK'S STOVE.—Nichoias S. Vedder, and Francis Ritchie, Troy, N. Y., assignors to William Resor & Co., Cincinnati, Ohio.

2,991.—STOVE DOOR.—Thomas Walker (assignor to Edward J. Hicks, and Gurdon G. Wolfe), Troy, N. Y.

2,992.—SPOON OR FORK HANDLE.—Le Roy S. White, Waterbury, Conn.

## PENDING APPLICATIONS FOR REISSUES.

*Application has been made to the Commissioner of Patents for the Reissue of the following Patents, with new claims as subjoined. Parties who desire to oppose the grant of any of these reissues should immediately address* MUNN & CO., *37 Park Row, N. Y.*

[ISSUED FOR WEEK ENDING MONDAY, MARCH 23, 1868.]

47,812.—DRILL BIT.—Horace F. Love, Windsor, Vt., assignee of William W. Grier, and Robert H. Boyd, Fulton, Pa. Dated May 23, 1865. Application for reissue received and filed February 29, 1868.

I claim, 1st, The notch, constituted, constructed, arranged, and disposed substantially as described.

2d, The reamers, constituted, constructed, arranged and disposed substantially as and for the purpose set forth.

71,466.—BRICK MACHINE.—Helmuth Dueberg, New York city. Dated November 26, 1867. Application for reissue received and filed March 11, 1868.

I claim, 1st, The within-described process of forming bricks by machinery, by exposing the clay to two subsequent operations, viz., forcing it through a forming die, so as to produce a bar of clay from which the roughly shaped bricks are cut off, and then pressing over these roughly shaped bricks, in suitable molds, substantially as set forth.

2d, The arrangement of one or more forming dies, F F', extending from the spout, E, in combination with a corresponding number of molds, I I', substantially as and for the purpose described.

3d, The feeder, K, in combination with the plungers, J J', operating substantially as set forth.

4th, The combination of one or more stationary press boxes, G G', and plungers, J J', with a movable table containing the molds, substantially as and for the purpose set forth.

5th, The recess, h, in the press boxes, to allow the surplus clay to escape, as set forth.

6th, The arrangement of a pair of molds, the followers of which are connected by a rocking lever, M, or its equivalent, for a mutual discharge of the bricks, as described.

7th, The pieces of flannel, n, or other absorbent material, supplied with oil from cups, m, in combination with the followers, L L', constructed and operating substantially as and for the purpose set forth.

61,431.—SEED PLANTER.—D. S. Holman, Conneautville, Pa

Dated January 22, 1867. Application for reissue received and filed March 14, 1868.

I claim, 1st, The revolving axle, C, and the clutch, b b', all arranged to operate in the manner substantially as and for the purpose set forth.

2d, The two seed slides, H H, placed one above the other, at the upper part of the tubes, G, and having springs, d, bearing against them, in combination with the wheels, I, and projections, e, having pins, f g, in their peripheries, all arranged to operate substantially in the manner as and for the purpose forth.

3d, The regulating slide, J, in combination with the seed slides, H H', arranged substantially as and for the purpose specified.

4th, The combination of the metallic tubes, L, and covering shares, O, all arranged and applied so as to be capable of operating and being adjusted, substantially as shown and described.

5th, The seed slides, H H', tubes, G, springs, d, wheels, I, projections, e, with the pins, f g, in combination with the slides, J, metallic tubes, L, and the covering shares, O, all arranged to operate in the manner substantially as and for the purpose specified.

35,899.—MODE OF FASTENING DOOR KNOBS TO THEIR SPINDLES.—Darius Skidmore, Seneca Falls, N. Y. Dated July 15, 1862. Reissue No. 2,473. Dated February 5, 1867. Application for reissue received and filed March 14, 1868.

I claim covering or inclosing the end of the coupling device of the knob shank and spindle, wholly or partially by the socket or sleeve of the rose, substantially as and for the purpose herein specified.

41,701.—METALLIC SHANK FOR BOOTS AND SHOES.—Edward Heaton, New Haven, Conn. Dated February 23, 1864. Application for reissue received and filed March 16, 1868.

I claim, 1st, A boot or shoe shank, composed of two strips united, the one being of a flexible but not necessary elastic material, and the other of an elastic material, substantially as and for the purposes herein shown and described.

2d, The combination of a tempered and untempered spring, in the manner and for the purposes shown and set forth.

3d, The combination with a boot and shoe shank of otherwise ordinary or suitable construction and material, of a spring united with the said shank, so as to bear upon the same at both ends thereof, substantially in the manner herein shown and specified.

35,355.—MEANS OF ATTACHING INDIA RUBBER TO PENCILS.—William C. Vosburgh, and William A. Ludden (assignors to John J. Merritt), Brooklyn, N. Y. Dated May 20, 1862. Application for reissue received and filed March 16, 1868.

We claim, 1st, The construction and use of separate casing, in combination with a rubber eraser, c, adapted to be applied to either end of a pencil, or pen handle, without necessity for previous preparation, and to allow the ready application and removal of the same, substantially as and for the purpose herein specified.

2d, We claim the within-described construction of the said casing, to wit: the two semi-cylindrical clamps, b b, formed as specified, and the ring or rings, d, in combination with the section of india-rubber, c, and the pencil or pen handle, a, as and for the purposes herein set forth.

36,538.—BIT BRACE.—G. Stackpole, New York city, and J. N. Winslow, Portland, Me., assignees of G. Stackpole. Dated September 23, 1862. Application for reissue received and filed March 17, 1868.

I claim, 1st, In combination with a divided bit, shank socket, having a contracted neck, A', as specified, the ring, E, for holding said bearing upon the shank, substantially as set forth.

2d, I claim forming the socket of a bit brace, with bit shank grooves, m m, of different depths, as and for the purpose set forth.

3d, I claim so forming the bearings, C C', that the lesser grooves therein may be made to receive more than one sized bit shank, without an enlargement of the grooves to the extent of the whole length of the socket or the bit shank, substantially as specified.

☞ NOTE.—*The above claims for Reissue are now pending before the Patent Office and will not be officially passed upon until the expiration of* 30 *days from the date of filing the application. All persons who desire to oppose the grant of any of these claims should make immediate application.* *MUNN & CO., Solicitors of Patents, 37 Park Row, N. Y.*

## Inventions Patented in England by Americans.

[Compiled from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

599.—ELECTRICAL SIGNAL OR ALARM.—George W. Shawk and Job Franz, Cleveand, Ohio. Feb. 22, 1868.

611.—ILLUMINATING GAS.—Charles M. Taintor, New York city. Feb. 24, 1868.

621.—HOOP SKIRT.—Thomas B. De Forest, Birmingham, Conn. Feb. 25, 1868.

647.—ELECTRO-MAGNETIC APPARATUS.—Laban C. Stuart, Mamaroneck, N. Y. Feb. 26, 1868.

650.—WASHING MACHINE.—James Turner, Robert Turner, Archibald Turner, M. C. Turner, T. C. Turner, and G. M. Turner, New York city. Feb. 26, 1868.

664.—CONSTRUCTION OF BOATS OR VESSELS.—Elisha Waters, George T. Balch, Clarence W. Waters, and George A. Waters, Troy, N. Y. Feb. 27, 1868.

685.—DRYING AND FINISHING FELTED GOODS AND FABRICS.—John H. Prentice, Brooklyn, N. Y. Feb. 28, 1868.

818.—TREATMENT OF FIBROUS MATERIALS, AND MEANS FOR RENDERING THE SAME FIRE AND WATER PROOF.—Robert O. Lowrey, Salem, N. Y. March 9, 1868.

## EXTENSION NOTICES.

James Bragley, administrator, and Mary Pitts, administratrix, of the estate of John A. Pitts, deceased, of Buffalo, N. Y., having petitioned for the extension of a patent granted to the said John A. Pitts the 4th day of July, 1854, for an improvement in horse power, for seven years from the expiration of said patent, which takes place on the 4th day of July, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 15th day of June next.

Warren Shaw and Parley G. Green, of Wales, Mass., having petitioned for the extension of a patent granted to them the 20th day of June, 1854, for an improvement in tentering cloth, for seven years from the expiration of said patent, which takes place on the 20th day of June, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 8th day of June next.

Edward Lindner, of New York city, having petitioned for the extension of a patent granted to him the 27th day of June, 1854, and reissued in two divisions Dec. 23, 1856, and numbered respectively 415 and 416, for an improvement in magazine, repeating, and needle guns, for seven years from the expiraton of said patent, which takes place on the 27th day of June, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 15th day of June next.

John Taggart, of Boston, Mass., having petitioned for the extension of a patent granted to him the 4th day of July, 1854, for an improvement in machines for excavating earth, for seven years from the expiration of said patent, which takes place on the 4th day of July, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 15th day of June next.

Horace Smith and D. B. Wesson, of Springfield, Mass., having petitioned for the extension of a patent granted to them the 14th day of February, 1854, and reissued the 10th day of October, 1854, this application having been authorized by act of Congress, for an improvement in fire-arms, for seven years from the expiration of said patent, which took place on the 14th day of February, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 29th day of June next.

George Hand Smith, of Rochester, N. Y., having petitioned for the extension of a patent granted to him the 18th day of July, 1854, and reissued in two divisions the 14th day of August, 1866, and numbered respectively 2,333 and 2,334, for an improvement in process of making steel direct from the ore, for seven years from the expiration of said patent, which takes place on the 18th day of July, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 29th day of June next.

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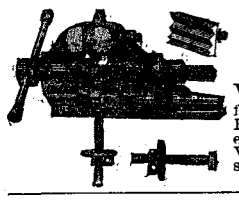

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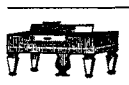

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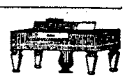

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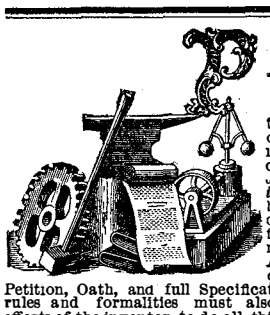

# PATENTS

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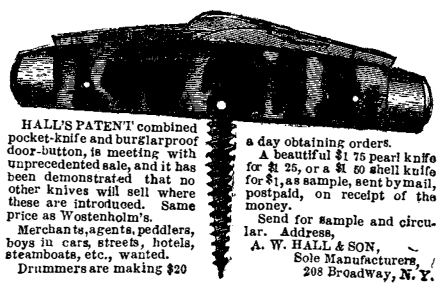

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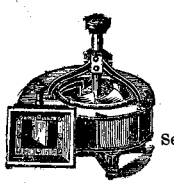

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